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# Metacognition and the teaching of writing

Submitted by

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For consideration as thesis for degree of Doctor of Philosophy  
of  
The Open University  
(Psychology)

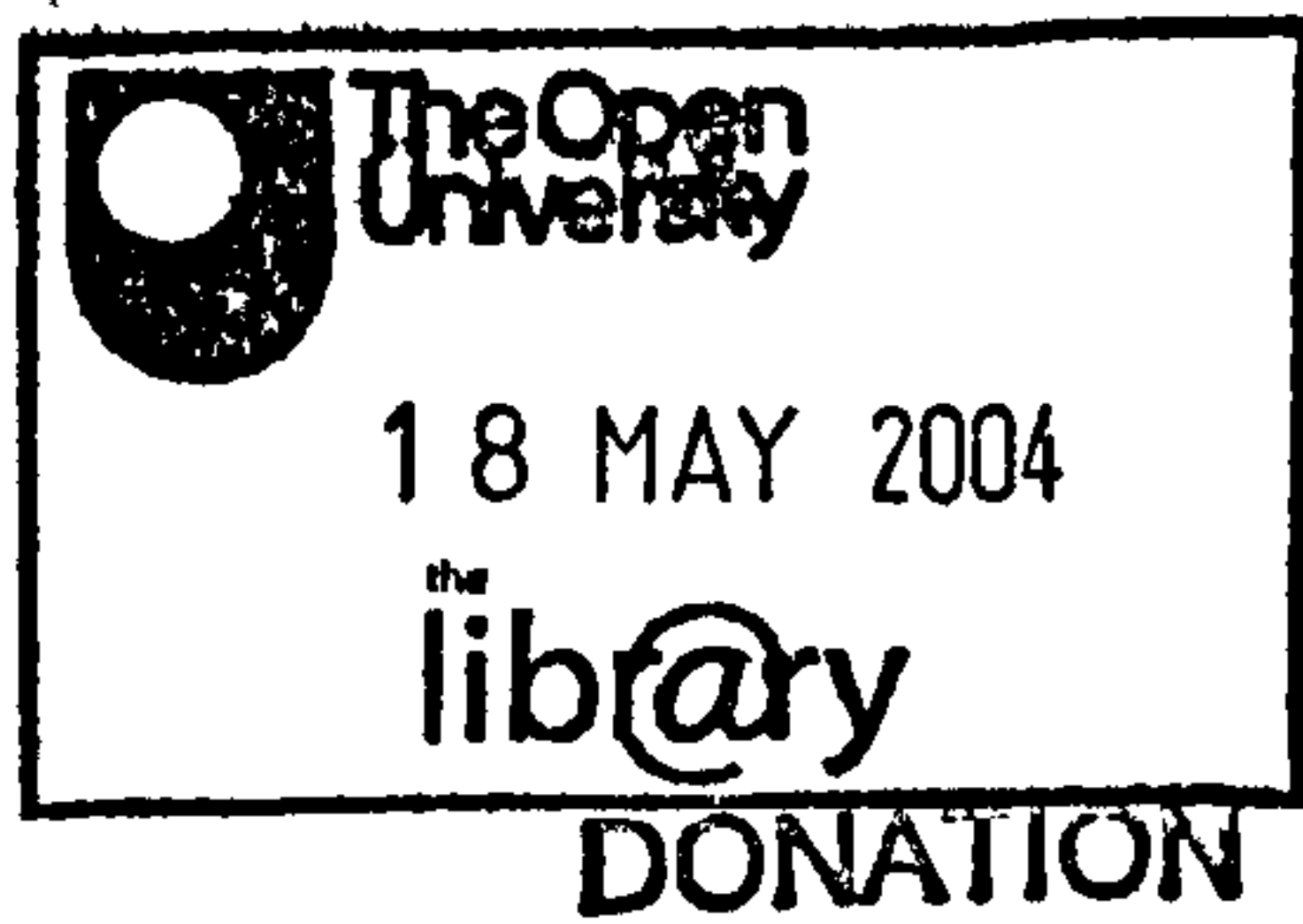
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## **Abstract**

This thesis has examined the relationship between the two areas of metacognition and the teaching of writing. The implementation of the study was with BEd students following a teacher education course and the associated teaching and data collection for this study was within the first two years of that (four year) course.

The study examines the potential for determining the links between metacognition and the teaching of writing in the context of preparing student teachers to teaching writing in the primary school classroom. Five specific research questions were identified. The first examined the measurement of metacognitive thinking in relation to writing as there appeared to be very little documented information about how this might be addressed. The second question focussed on how the model of metacognition proposed by Nelson and Narens (1990) might be used in teaching about metacognitive regulation and the third question similarly addressed the use of the Hayes (1996) model of writing in the context of teaching student teachers about the theory of writing. This study gave particular (but not exclusive) attention to selected models of metacognition and of writing in the associated teaching and data collected sessions. The fourth question studied the development of student teachers' understanding of a metacognitive approach to their own writing as it might influence their understanding of teaching writing in the classroom. The final question

set out to derive a possible composite theoretical model of metacognition and writing, with the expectation that this might be an additional support for future teaching in this area.

Experimental and control samples were established with the teaching about metacognition and writing being given to only the experimental sample. The nature of the teaching (covering theoretical concepts in a relatively new area of study, to students at the beginning of 4 year BEd course) suggested a structure which comprised several stages, generally alternating between teaching and data collection, and spread over a two year period. The focus of these stages was progressively from promoting student teachers' understanding of metacognition in relation to their own writing to identifying links with teaching writing in the classroom and finally to an enhancement of their teaching writing in the classroom. This resulted in a different format of presentation of the implementation, data collection, results analysis and discussion of findings than might customarily be found in higher degree work of this nature. Here, the key findings and discussion and are presented as they occurred throughout the study rather than as separate chapters following the description of the implementation of all the stages.

New features which were developed in this study were data collection material to measure metacognition in relation to teaching writing and the means of deriving a writer profile. The findings from the study indicated that the measures of metacognition and the writer profile had produced relevant and functional information. These suggested that the students' metacognitive knowledge had improved by the end of the study as had their awareness of metacognitive regulation. Additionally, it was shown that students held different metacognitive models of writing for themselves and for their pupils and that the model for their pupils changed over the two years of the study whereas that for themselves had remained unchanged. These findings were linked with the students developing awareness of models of expert and novice writers.

The potential for further development of metacognitive models of writing is recognised.

## Acknowledgements

I wish to express my appreciation of the support I have had from Northern College and latterly the University of Dundee for the facilities to conduct this research.

I particularly wish to acknowledge the unstinting patience and co-operation shown by my internal supervisor, Dr Ian McPherson, and to thank him for his encouragement, support and wise counsel. Additionally I warmly appreciate the advice and assistance offered to me, often at short notice and at busy times of the year, by my external supervisor, Professor Rhona Johnston. I am grateful to Dr Jennifer Tuson for encouraging me to make a start to this study, offering generous encouragement throughout its implementation and for making such valuable comments on the final draft of this submission.

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JME

September 2004





# Contents

Abstract	iii
Acknowledgements	v
List of Tables	ix
List of Figures	xiii
Chapter 1	
Introduction	1
Chapter 2	
Review of the literature	5
Part 1 The nature of metacognition	11
Part 2 Metacognition in practice	27
Part 3 Regulation and self-regulation	37
Part 4 Models of writing	57
Part 5 Data collection procedures	81
Chapter 3	
Research questions, design and structure of the study	103
Chapter 4	
Stage 1: Collection of baseline data	119
Chapter 5	
Stages 2, 3 and 4: Thinking about writing	145
Chapter 6	
Stages 5, 6 and 7: Profile of a writer	167
Chapter 7	
Stages 8 and 9: Metacognitive awareness	199
Chapter 8	
Stages 10 and 11: Thinking about teaching writing	215

Chapter 9	235
Stages 12, 13 and 14: Metacognition in practice	
Chapter 10	259
Stages 15 and 16: A metacognitive model of writing	
Chapter 11	291
Conclusions and implications	
References	327
Appendix 1	
Data gathering questionnaire used at stages 1 and 16	337
Appendix 2	
Data gathering questionnaire used at stage 4	341
Appendix 3	
Data gathering questionnaire used at stage 6	
Personal writer profile	345
Appendix 4	
Data gathering questionnaire used at stage 11	
Children's writer profile	349
Appendix 5	
Data gathering questionnaire used at stage 14	353
Appendix 6	
Responses from two students at all data collection stages	357

# List of Tables

Table 2.1	Summary of the terms used in identifying different types of metacognition	17
Table 2.2	Classification of approaches for teaching metacognitive strategies and skills, with examples (Osman and Hannafin)	32
Table 2.3	Self-regulatory processes in writing (Zimmerman and Risemberg)	54
Table 2.4	Classification of data collection methods in cognitive writing research Janssen, van Waes and van den Bergh)	81
Table 2.5	Components of self-regulated learning which have been examined in studies of metacognition (Winne and Perry)	93
Table 2.6	Procedures for measuring self-regulated learning (Winne and Perry)	96
Table 3.1	Summary of stages for all samples with dates of implementation	107
Table 4.1	A summary of the key elements of writing	121
Table 4.2	Four key aspects of writing and their relationship with metacognitive knowledge	122
Table 4.3	Summary of responses to questions 1 and 2 at stage 1	122
Table 4.4	Rank order of responses to question 3 (with frequency in each category)	125
Table 4.5	Twelve response categories for question 4, with examples, at stage 1	126
Table 4.6	Responses in three major categories for question 4 at stage 1	128
Table 4.7	Summary of responses to question 5 at stage1	129
Table 4.8	Summary of responses to question 6 with frequencies and rank order of categories	131



Table 4.9	Comparison of highest-ranking response categories for question 2 and question 6	132
Table 4.10	Summary of responses for question 7 at stage 1	133
Table 4.11	Number and ranking of responses to question 7 for combined experimental sample	134
Table 4.12	Factors identified from factor analysis of responses to question 7	135
Table 4.13	Distribution of writing grades for analytic and holistic assessment (sample C)	138
Table 4.14	Analysis of type of knowledge assessed in each question at stage 1	139
Table 5.1	Rank order of categories of responses at stage 1 and 3 about steps to produce a piece of writing	148
Table 5.2	Rank order of categories of responses at stage 1 and 3 about personal strengths as a writer	150
Table 5.3	Frequency of responses to stage 4 question 1	152
Table 5.4	Rank order of responses to stage 4 question 1a and question 1b	153
Table 5.5	Rank order of responses to stage 4 question 1c	154
Table 5.6	Frequency of responses to stage 4 question 2 for experimental samples	155
Table 5.7	Rank order of responses to stage 4 question 2a and question 2b for sample C	156
Table 5.8	Rank order of responses to stage 4 question 2c	157
Table 5.9	Frequency of responses to stage 4 question 3 for experimental samples	158
Table 5.10	Summary of how items from stage 4 indicated different forms of metacognitive knowledge and regulation	165
Table 6.1	Categories of all responses given at stage 4 with frequency of occurrence	168
Table 6.2	Links between stage 4 response categories and the five elements of the Hayes (1996) model of writing	171
Table 6.3	Mean values and distribution of ratings for each category of the writer profile for experimental samples	176
Table 6.4	Average writer profiles for experimental samples	183
Table 6.5	The average writer profile combined experimental sample	177
Table 6.6	Number of responses to stage 4 question 1 (relating to knowledge of the task) for each stage 7 writing grade with relative frequencies of occurrence per student in each grade	187

Table 6.7	Number of responses to stage 4, question 2 (relating to the genre adopted) for each stage 7 writing grade with relative frequencies of occurrence per student in each grade	188
Table 6.8	Number of responses to stage 4, question 3 (relating to deriving the content) for each stage 7 writing grade with frequencies of occurrence per student in each grade	188
Table 6.9	Analysis of comments given at stage 4 under the six response categories showing greatest difference between students with highest and lowest writing grades at stage 7	189
Table 6.10	Average values for each writer profile element across each grade of writing assessment	191
Table 6.11	Average values for each writer profile element for combined low grades of writing and combined high grades of writing	191
Table 7.1	Summary of responses for Question 7 at stage 1 and stage 9	204
Table 7.2	Comparison of quartile distributions for responses to question 7 at stage 1 and stage 9	205
Table 7.3	Factors identified from factor analysis of question 7 responses at stages 1 and 9	207
Table 7.4	Changes from stage 1 to stage 9 indicated by analyses of quartile distributions and of factor analysis for all samples	209
Table 8.1	Mean values and distribution of ratings given for each category of children's writer profile for experimental samples	222
Table 8.2	Average students' writer profile and average children's writer profile	226
Table 9.1	Two strategies for writing	241
Table 9.2	Examples of regulation activities	244
Table 9.3	Number of responses in the area of social regulation at stage 14	248
Table 9.4	Number of responses in the area of motivational regulation at stage 14	249
Table 9.5	Number of responses in the area of physical environmental regulation at stage 14	250
Table 9.6	Number of responses in the area of cognitive regulation at stage 14	251
Table 10.1	Numbers of respondents at stages 1 and 16	266
Table 10.2	Summary of responses to questions 1 and 2 at stage 1 and stage 16 and significance of differences for each sample	267
Table 10.3	Summary of responses to question 3 at stage 1 and stage 16	268
Table 10.4	Rank order and quartile distribution for responses to question 3 at stages 1 and 16	269



Table 10.5	Numbers of responses in the major categories for question 4 at stages 1 and 16	271
Table 10.6	Students responding in the major categories for question 4 at stages 1 and 16	271
Table 10.7	Distribution of stage 16 writing grades for stage 16 responses under 'monitoring plus control' in question 4 (samples A and c combined)	272
Table 10.8	Summary of responses to question 5 at stages 1 and 16	273
Table 10.9	Frequencies of categories of response to question 6 at stages 1 and 16	274
Table 10.10	Summary of responses for Question 7 at stage 1, stage 9 and stage 16	276
Table 10.11	Rank order of frequency of responses for Question 7 at stages 1, 9 and 16	277
Table 10.12	Factors identified from factor analysis of question 7 responses at stages 1, 9 and 16	278
Table 10.13	The relationship between the items from question 7 and the key aspects of writing used at stage 1	281
Table 10.14	Changes from stage 1 to stage 16 indicated by analysis of quartile distributions and factor analysis for all samples	281
Table 10.15	Numbers of students with different writing grades at stages 1, 7, 9 and 16	282
Table 10.16	Percentages of lower-graded writers and higher-graded writers at stages 1 and 16	283
Table 10.17	Crosstabulation of writing grades at stages 1 and 16 for sample C	283
Table 10.18	Changes in the types of metacognitive knowledge indicated by a comparison of the findings from stage 1 and stage 16 for each question in the data collection instrument	285
Table 11.1	Summary of components of metacognitive knowledge and regulation (Winne and Perry) addressed at stages 1, 4, and 16	295

## List of Figures

Figure 2.1	Model of metacognition (Nelson and Narens)	24
Figure 2.2	Model of self-regulation (Carver and Scheier)	39
Figure 2.3	Model of regulation of the learning process (Vermunt)	43
Figure 2.4	Model of self-regulation in learning (Boekaerts)	45
Figure 2.5	Functional categories of writing (Britton, Burgess, Martin, McLeod and Rosen)	59
Figure 2.6	Hayes and Flower's original model of writing (Hayes and Flower)	61
Figure 2.7	Hayes' revised model of writing (Hayes)	63
Figure 2.8	The knowledge telling model of writing (Scardamalia and Bereiter)	68
Figure 2.9	The knowledge transforming model of writing Scardamalia and Bereiter)	70
Figure 2.10	Model of text production process and working memory (Kellogg)	74
Figure 6.1	Hayes' revised model of writing (Hayes)	169
Figure 6.2	Sample profile of a writer (adapted from Hayes model of writing)	172
Figure 7.1	Elaborated model of metacognition (based on Nelson and Narens)	201
Figure 7.2	Progressive development of object levels to meta-levels (Nelson and Narens)	202
Figure 9.1	Diagrammatic representation of interaction between LTM and STM	237
Figure 10.1	Diagram suggesting links between course input elements	261
Figure 10.2	Balance between engagement and reflection in memory (Sharples)	263

Figure 11.1	Outline format of Hayes model of writing simplified to function as a profile of a writer	306
Figure 11.2	Model of metacognitive regulation (Nelson and Narens)	306
Figure 11.3	Proposed elaborated structure of Nelson and Narens model of metacognitive regulation	308
Figure 11.4	A possible composite model of metacognition and writing	311

# **Chapter 1**

## **Introduction**

### **The context of the study**

The origin of this study lay in the author's long-term interest in the area of metacognition and a lengthy experience in the field of literacy research. These became focused as a result of involvement in the development of teacher education courses at Northern College of Education where an interest in "thinking about learning" and "learning about thinking" had become more widespread. These interests were supported by an increase in research activities reported more generally in the literature in the areas of teaching thinking and metacognition. For example, McGuinness (1993) suggested that cognitive research had begun to examine topics related to school learning and had introduced metacognition as a modern aspect of teaching thinking skills and of relevant experimentation. Also, the importance of teaching writing in primary and secondary schools has gained prominence over the last decade (HM Inspectors of Schools, 2000) and the impact of this has also been observed in the higher prominence given to instruction in teaching writing within teacher education degree courses. Much of this teaching has been directed at the procedures which novice writers are expected to follow as they practise and develop the



skills of writing. However, research into developing a metacognitive approach to *teaching* writing seemed to have had little attention.

From these interests, experience and concerns arose two premises:

- A metacognitive approach to teaching writing has been *rarely studied* and is worthy of further investigation, and
- Considering a metacognitive approach to teaching writing is *itself worthwhile* and merits further promotion.

The first premise seemed to be supported by a scarcity in the current literature of substantial contributions about metacognition and writing. It was unclear if there were any good reasons why this area had not been previously widely studied. On balance, it was decided that the selected area of study was substantially original and worthy of further investigation. Examination of support for the second premise suggested that a metacognitive approach to teaching writing was firmly linked with “thinking about thinking and learning” in general and “thinking about writing” in particular. From the author’s experience in teacher education, it was clear that each of these was becoming more prominent in teacher education courses, and consequently a study of a metacognitive approach to teaching writing was seen as relevant and worthwhile in promoting learning about writing. The conclusion was that a study of a metacognitive approach to the teaching of writing was valuable, appropriate and timely.

## **The rationale of the study**

At a general level, it was anticipated that this study should focus on the aspects of metacognition which were particularly relevant to writing. These included a closer examination of the concepts related to teaching writing in the expectation that this might eventually lead to a more informed view of how to instruct student teachers in the process of teaching writing to their pupils. That is, the intention was to attempt to enhance the teaching of students so that they might have a better

understanding (a metacognitive understanding) of teaching writing. Success in improving students' metacognitive understanding of the writing process was expected to lead these students towards being more able to understand and to successfully implement the teaching of writing in the classroom. Secondary to this focus on improving student teachers' insight and expertise in teaching writing, it was recognised that there might be some improvement in their own writing skills as result of their better understanding of the writing process.

In terms of advancing knowledge, it was planned that by focusing on aspects of metacognition and the teaching of writing, this study might both add to an understanding of the interaction between these two areas and make a contribution to promoting the knowledge, understanding and skills of student teachers about to enter the teaching profession. It was believed that through an increased knowledge and understanding of metacognition as it related to the teaching of writing, student teachers would be encouraged to develop a metacognitive model of writing and adopt a more metacognitive approach to teaching writing with their pupils. In the present study, this influence would initially be relevant only to students following the BEd course at Northern College of Education, but in the longer term there might be scope for a metacognitive approach to teaching writing to be adopted more widely by practising teachers in the primary school.

### **Aspects of metacognition and writing to be addressed by the study**

It seemed that metacognition and the teaching of writing has not been a widely researched area and therefore the most relevant aspects worthy of empirical study have not been extensively reported. The selection of the focuses for this study was therefore based as much on speculation as on suggestions arising from established research literature. This study was therefore *substantially exploratory* and the ground examined was previously relatively unresearched. It was therefore appreciated that conclusive findings were unlikely and that in some areas subsequent studies would be required.



Despite the relative novelty of this investigation, there were fundamental aspects of metacognition and writing which were seen as particularly relevant and were therefore addressed in the study. They were as follows.

- Identifying teacher education students' awareness of their knowledge about their own writing, including knowledge of their writing skills and abilities.
- Helping students to become aware of significant metacognitive knowledge relating to personal writing.
- Encouraging students to adopt a metacognitive approach to thinking about their own writing.
- Encouraging students to transfer thinking about their own writing to their role in teaching children to write.
- Linking students' understanding of a metacognitive approach to writing to current theoretical models of metacognition and of writing.
- Using students' perceptions of their own writing and of teaching of writing in the classroom to focus on students' understanding of the distinction between novice and expert writers.
- Helping students to become more aware of the regulation (monitoring and control) aspects of metacognition during the writing process.
- Promoting self-regulation as a means of more independent progress in learning about, and teaching, writing.

Notwithstanding the relative novelty of this study, the clarification of these as suitable aspects for investigation was undertaken through a review of the current relevant literature.

## **Chapter 2**

### **Review of the literature**

**This review of the literature is presented in the following sections**

**Overview**

**Part 1 The nature of metacognition**

**Part 2 Metacognition in practice**

**Part 3 Regulation and self-regulation**

**Part 4 Models of writing**

**Part 5 Data collection procedures**

**Conclusions**



## Overview

Because of the nature of this study, the associated review of the literature has had to examine the available resources relevant to two fields, metacognition and writing. It was obvious that to give a comprehensive review of the relevant literature in both fields would result in a chapter which might be over-long for this submission. Therefore it was necessary to be particularly selective. This has resulted in a reduction both in the range of topics covered within the fields of metacognition and writing, and (to a lesser extent) in the comprehensiveness of the coverage given to the areas finally selected for inclusion. Further, the use of the review of the literature was more to establish the content and extent of the development of relevant concepts significant to the relationships between metacognition and writing. It was less of a critique of the related methodology of the studies examined.

There is a balance within the study associated with this submission, between an emphasis on metacognition and an emphasis on writing. That balance is in favour of metacognition as the prime focus and thrust of both the teaching and the data-collection elements of this undertaking. Largely for that reason, the review of the literature is more focused on metacognition than on writing. The choice of writing as the curricular area for the promotion of this study was partly because there was



little reported evidence of it having been extensively studied previously, and partly because it was closely related to the field of reading, where there have already been many studies of links with metacognition.

The structure of the literature review has attempted to follow a logical order and to reflect a common thread between five related parts. The order has firstly been progressive from more general in the earlier parts of this chapter to more specific in later parts. This is most prominent within parts 1 to 3 where part 1 attempts to review the earlier proposals and definitions relating to the nature of metacognition and to identify some explanations of the widely recognised aspects of metacognition, namely, knowledge and regulation (monitoring and control). In addition to the literature describing the theoretical beliefs associated with metacognition, there has been substantial literature on examining metacognition in practice and within the recent studies, most have been concerned with an examination of practical applications of metacognition or an attempted explanation of practical experiences from a metacognitive perspective. This more specific explanation of metacognition is given in part 2, but has been largely limited to reports of metacognitive applications in education and learning. The studies associated with an explanation of metacognition-related investigations in other areas (often, but not exclusively, related to educational curricula) are recognised but not reviewed. In part 3 the focus is again more specific, and relates to one of the more central elements associated with metacognition in learning. This is the area of regulation (or self-regulation). To adequately review the relevant literature, it was felt appropriate to include some of the texts outwith those most closely related to the literature on metacognition. Within this part, however, all the explanations of the models of regulation have been related to the models of metacognition presented earlier.

The second feature of the order of the literature review has been the progression from metacognition to writing. Clearly, writing is one aspect of the potential curriculum applications of a metacognitive approach and as such it reflects a yet more specific aspect of the curriculum applications of metacognition in practice given in part 2. Part 4 therefore explores the background of the theoretical constructs which underlie the application of a metacognitive approach to writing.

Thus part 4 has been purposely restricted to some of the theories and models of writing, with no attempt to include writing as a curricular area or how writing might be taught in the classroom. Although the relevant literature about theories of writing is extensive, much of this relates to a small number of models. These models have clearly been seminal in an understanding of the writing process and have been responsible for what appears to be the bulk of the published research on writing in the last two decades. The place of other models of writing reported in the literature is recognised, and these models have been examined but are omitted from this review, in the interests of curtailing an over-long chapter. To assist in establishing links between certain metacognitive processes and an understanding of the writing process, a section has been added to part 4 summarising the function of memory in writing.

The final part of the literature review was seen as ‘completing the picture’ with an examination of how research has endeavoured to implement studies of metacognition in practice, with particular focus on the measurement of metacognitive thinking and of personal metacognitive models.

The structure described presumes a common thread throughout all five parts of the literature review. This is taken to be the concept of a metacognitive model. This concept is fundamental to understanding what metacognition comprises (part 1), how it might be applied in practice (part 2), and what metacognitive skills a model entails when they are involved in regulation (part 3). A metacognitive model is also a construct which can be applied to writing (part 4) and is the subject of a clear understanding of how metacognition might be measured (part 5). The value of an identified common thread is appraised in the concluding section of this literature review.





## Part 1    The nature of metacognition

### Background

Writing about metacognition has taken place substantially within the last twenty-five years or so and, by most accounts, was given the first major impetus of this modern phase by the seminal writing of Flavell (1976) when the term ‘metacognition’ was introduced. Flavell elaborated a view that has subsequently become accepted and widespread, that knowledge about one’s own thinking and cognitive processes can be recognised. He also proposed the view that metacognition was more than knowledge, but included active participation in the regulation (monitoring and control) of cognitive processes during learning activities. These two notions, metacognitive knowledge and the metacognitive process of monitoring and control, were to appear again in contemporary and in later writing. In addition to Flavell’s writing, the most commonly cited sources concerning the ideas associated with metacognition are Kluwe (1982, 1987) and Brown (1978, 1987). Kluwe (1987) elaborated Flavell’s original arguments related to how individuals have knowledge about their *own* thinking as well as that of *others*. He also explored how intelligent or thinking individuals have the capability to monitor and regulate their own thinking. Brown (1978) referred to metacognition as the state of one’s knowledge and the skills in controlling the cognitive



processes involved in achieving a learning outcome, predominantly through introspection and self-interrogation.

These earlier writers were largely concerned with the theoretical aspects of metacognition and with explanations of current understanding of memory and cognition. More recently, the interest in metacognition has shifted to practical applications in fields such as education, everyday memory and mental health. For example, Hacker, Dunlosky and Graesser (1998) have brought together research on metacognitive aspects of education, and Perfect and Schwartz (2002) have attempted to present a broader picture of the applications of metacognition to many everyday situations.

The quantity of writing about metacognition continues to increase, reflecting a growing interest in this area and its potential impact on psychological and educational research. Despite this, however, there is still much about metacognition which remains speculative. Further, although the study of fields where applied metacognition might make a contribution is ever widening and increasing, there remains much which is unknown and unexplored. The belief behind the present study is that the teaching of writing, particularly to children in the primary school, is one such area, and that consequently there is still much to be learned about the practical application of metacognition in this context.

Underlying much of the writing about metacognition has been its relationship with the more general concept of cognition. This has often referred to the hierarchical order of the two concepts where the 'meta' of metacognition is indicative of 'beyond' or 'more than' the more basic cognition. Just how metacognition functions in the higher plane is still a matter of conjecture and recent writing has suggested that there is still much to be studied in examining how, for example, metacognitive knowledge and skills are used to improve or optimise cognitive performance (Koriat, 2002).

## Metacognitive knowledge

Within some of the earlier writing about metacognitive knowledge, a distinction was made between metacognitive knowledge and metacognitive awareness. Although not all authors made this distinction, Flavell (1979) suggested that there were important differences between the two concepts. Metacognitive knowledge referred to the known and identifiable knowledge which an individual had about his mental abilities and his cognitive strengths and weaknesses. Thus individuals would know what they did, and what they did not, know. That is, metacognitive knowledge is predominantly explicit. Metacognitive awareness, on the other hand, referred to the feelings and judgements which individuals made about their knowledge, such as in the retrieval of relevant information from memory. Awareness was more to do with being conscious of aspects of knowledge, such as knowing more or knowing less, and knowing the detail or knowing the broad gist of relevant knowledge. Awareness, as suggested by Flavell, was therefore less precise in terms of the specific knowledge which people have, although it was related to how they might understand and evaluate the extent of their knowledge, and the strengths and weakness of their knowledge. This view of awareness seems to suggest that it is at least partially explicit, but it may also be also partially implicit and therefore possibly less subject to self-regulation. It is no means clear, however, if implicit awareness *cannot* be self-regulated. This feature of awareness is important for the present study as the role of regulation (and self-regulation) in metacognitive functioning is taken to be a central feature of teaching about metacognition in a curriculum context.

Some of the early writing on metacognitive knowledge also identified the different categories of knowledge with which metacognition might be related. The categories most commonly described were declarative knowledge (“knowing that”) and procedural knowledge (“knowing how” or “knowing how to”). Declarative knowledge was usually described as knowledge which learners have about themselves and about their own thinking or cognitive abilities and mental activities. The position is less clear with regard to procedural knowledge and different interpretations are commonly used. One such interpretation is in terms of knowledge about using processes which learners engage in while regulating their own learning (Brown, 1978, 1980, 1981, 1987; Flavell,



1976, 1979, 1987). Although Flavell initially proposed both categories of knowledge, it has been suggested (Scheider and Lockl, 2002) that Brown significantly extended Flavell's original ideas about procedural knowledge. It was reportedly her view that clarified the regulatory function of procedural knowledge in selecting and implementing strategies and monitoring their usefulness.

An additional category of metacognitive knowledge was suggested by Paris, Lipson, and Wixson (1983) and elaborated by Cross and Paris (1988), namely conditional knowledge. These authors argued that there was a category of metacognitive knowledge which involved understanding the conditions pertaining to when or where particular approaches or strategies should be used in problem solving. Their argument has been claimed to explain some of the links between the knowledge aspects of metacognition and the monitoring and control aspects. Thus, conditional metacognitive knowledge is seen as concerned with *appropriateness* of learning or problem-solving strategies. Accordingly, there are some interesting aspects of conditional metacognitive knowledge that raise questions which do not yet appear to have been fully explored. For instance, conditional knowledge is probably dependent on metacognitive declarative knowledge and metacognitive procedural knowledge already being available. In addition, it may not yet be clear how learners acquire conditional knowledge and how they use it in different tasks. The ability of learners to know that they know where and when to apply learning and problem solving strategies, will relate to the question of what 'appropriateness' means, and whether that state of knowledge relates more to appropriateness for the learners or appropriateness for the task. These views raise the question of whether conditional knowledge should be considered be as an additional category of metacognitive knowledge

More recent writing has proposed that a difference existed between studies of metacognition where the focus was the nature of metacognitive knowledge from the broad cognitive perspective of children's *thinking* (such as comprehension, communication and problem solving) on the one hand, and studies of children's knowledge of their *mental world* on the other (Schneider and Lockl, 2002). The latter has also been referred to as children's 'theory-of-mind' and dealt with aspects of children's knowledge of their mental representations of their own world or knowledge about their

mental states (Wellman, 1985). Concern with these two directions of study led to an attempt by Kuhn (2000) to link them. She suggested two new terms to describe what she identified as two different types of “meta-knowing”. The first involved knowing about declarative knowledge and was related to children’s understanding of their mental states and thus was linked with the ‘theory-of-mind’ aspect of metacognitive research. This she termed “metacognitive knowing”. The second component was where children know about their cognitive processes and how these influenced their mental performance, and thus was knowledge about procedural knowledge. This she termed “metastrategic knowing”. A more widespread use of these two terms does not yet appear in the literature but they seem to have a lot to commend them in being a useful and easily understood discrimination between the two commonly reported forms of knowledge associated with metacognition.

The fundamental nature of metacognitive knowledge was also described by Baker and Brown (1984) as being relatively stable and usually statable. They explained this by suggesting that when metacognitive knowledge is statable, it must therefore also be understood and internalised. This was taken to indicate that in order to function metacognitively, individuals would have to become aware of their metacognitive knowledge through internalisation or awareness. This representation or understanding through internalising of metacognitive knowledge was explained by Flavell, Miller and Miller (1993) who suggested metacognitive knowledge was that part of the *total* knowledge and beliefs which related to thinking, learning and cognition. A more detailed argument has been advanced by Schneider and Lockl (2002) who indicated that only declarative knowledge was statable and stable and that, further, it was also relatively late developing. Procedural knowledge was seen as substantially different, much less stable in character and not necessarily statable. They also proposed that procedural knowledge was less dependent on age, though it would be significantly dependent on the specific task or situation to which it referred.

Flavell, Miller and Miller (1993) extended their earlier explanation of metacognitive knowledge to encompass the ‘whole-person’ perspective of metacognition and suggested that such knowledge is to do with all aspects of the human mind. They argued that this wider perspective linked well



with the earlier proposals (Flavell, 1987) that metacognitive knowledge could be subdivided into three types; person-knowledge (or self knowledge), task-knowledge and strategy-knowledge.

Person knowledge covered all the knowledge and beliefs which individuals gather about *themselves* as a thinkers and learners, about *comparisons* between themselves and others, and how individuals *interact* cognitively within their environment. These three aspects were referred to, respectively, as self-knowledge at an intrapersonal level, an interpersonal level and at a universal level (Flavell, 1987). Task-knowledge appeared in two forms, knowledge about the cognitive features of the task, and knowledge about the task's intellectual demands. Flavell (1987) appears to suggest that each of these forms of task-knowledge contributed differently to the individual's metacognitive awareness of a task as they would be used in addressing a task in a problem-solving environment. The principal feature of strategy knowledge appeared to be knowing the difference between cognitive strategies (such as problem solving procedures) and metacognitive strategies (such as knowing which strategies to use).

Studies have suggested the three categories knowledge frequently appear together. For example, task knowledge and strategy knowledge were the focus of some of the studies by Flavell, Miller, and Miller (1993), where the links between remembering and understanding were examined. From their findings, Flavell *et al* drew two conclusions; first, that recall is not necessarily indicative of understanding, and second, that some strategies which are relevant to understanding are of little help in remembering. Although the latter will be true in some instances, it may not always be so, as much other memory research has indicated that if something is meaningful, it is easier to remember. A further conclusion from these studies was that school children were better versed in remembering than in comprehending and that when they were required to select a strategy they could do so with much greater ease for the former than for the latter. In fact, comprehension tasks were often treated like remembering tasks, such that strategies for remembering were often chosen for comprehension tasks. Examples of children rote-learning substantial amounts of material in order to answer examination questions have long been in evidence, although this may be more a reflection of poor teaching than of innate cognitive abilities.

Finally, it seems worthwhile to attempt to draw some links between the three different types of knowledge which Flavell suggested and the wider declarative, procedural and conditional categories of knowledge. Metacognitive knowledge which is person knowledge includes what individuals know about themselves as thinkers and learners and, Flavell claims, is predominantly declarative, but perhaps it also includes an element of knowing how to use information and interact cognitively with the environment. Therefore it may also relate to procedural knowledge. Metacognitive knowledge which is task knowledge may not be quite as clearly identified as both declarative and procedural. Knowledge about a task is usually about the nature of the information relating to a cognitive task and to its intellectual demands, and these are examples of declarative knowledge. The procedural aspects are probably more closely tied in with metacognitive strategy knowledge which relates to knowing which particular approach or technique to adopt to achieve a learning goal. Because conditional knowledge is largely to do with ‘when’ and ‘why’ a particular approach should be adopted, it is probably associated with strategy knowledge rather than with person or task knowledge.

The terminology used in the literature reviewed has been summarised in Table 2.1. This attempts to suggest where there might be some common ground across the different terms used and should assist in establishing some of the links suggested in the later chapters of this report.

**Table 2.1**        Summary of the terms used in identifying different types of metacognitive knowledge

<i>Forms of knowledge</i>	<i>Types of metacognitive knowledge (after Flavell, 1976)</i>	<i>Forms of meta-knowing (after Kuhn, 2000)</i>	<i>Stability and statability (after Baker &amp; Brown, 1984; Flavell et al 1993; and, Schneider &amp; Lockl, 2002)</i>
Declarative knowledge	Person knowledge and Task knowledge	Metacognitive knowing (linked with ‘theory-of-mind’)	Stable and statable
Procedural knowledge	Person knowledge, Strategy knowledge and perhaps Task knowledge	Metastrategic knowing	May be less stable and not necessarily statable
Conditional knowledge	Strategy knowledge		



## Metacognition and cognition

Examining the relationship between cognition and metacognition can help with understanding the relationship between metacognitive knowledge and metacognitive regulation (monitoring and control).

First, the relationship between cognitive knowledge and metacognitive knowledge. The two are similar in the basic aspects of how they are obtained (through experience as well as the maturity of the learner), their level of generality or specificity, and their hierarchical organisational structure. Also, the terms used to describe the 'facts' or ideas of which both forms of knowledge comprise, are similar.

An explanation of this might include that knowledge at a cognitive level is a measure of success, such as where individuals have collected information through experience and exposure to everyday learning events. For example, children collect a lot of knowledge but may not be able to use it all. There is, therefore, a second form of success in knowing *about* that knowledge through having a greater understanding of it, perhaps due to a more comprehensive internal structuring or through a more comprehensive set of experiences. This is metacognitive knowledge and would be available, though to different degrees, to individuals of all ages. Individuals who have greater metacognitive knowledge about their own experiences are better able to use the 'meta' state to comprehend their knowledge. Metacognitive knowledge therefore allows individuals to know why, as well as what, with regard to their knowledge. Flavell, Miller and Miller (1993) suggested that a consequence of this is that metacognitive knowledge allowed individuals to more meaningfully interpret new behavioural events because of their more comprehensive arrangement of past experiences. They suggested that would include being able to interpret better and more intuitively, other people's behaviour. Davidson and Sternberg (1998) also argued this point and indicated how this metacognitive facility was linked both with age and intelligence. They suggested that younger children and less intellectually able children were less able to adopt

metacognitive processes for interpreting personal knowledge within the context of life experiences, than their older able and more intellectually capable colleagues.

Vygotsky (1962) also suggested that the difference between cognitive and metacognitive knowledge might be reflected in the stages of development of knowledge. He proposed that knowledge was initially acquired unconsciously, such as by young children increasing their knowledge of the real world without being aware of what they have learned. This was replaced through maturity with an increase in conscious knowledge control, particularly in terms of beginning to know what is known and what is not known. This was interpreted as adding value for the learner, a value which might not be measurable in precise terms, but might be expected to give the user 'an edge' over those whose metacognitive knowledge was rather poorer. In educational terms this is probably best interpreted as an advantage in learning for those who have a further developed level of metacognitive knowledge than those functioning at a lower level.

The position suggested by Bracewell (1983) attempted to be more precise in discriminating between the two forms of knowledge. He suggested that a criterion of metacognitive knowledge was that it should be *statable* (also a view expressed by Baker and Brown, 1984) because verbalisation involved the individual in making deliberate choices about what could be said. In doing so, the individual ordered and structured cognitive knowledge in a way that was relevant and appropriate to the learning situation. Selecting knowledge in this context, suggested Bracewell, meant that it could not be rote memorised or imitated from another individual and so it had to be the product of a conscious mental activity related to 'knowing about' the relevant cognitive knowledge. To be *statable*, the metacognitive knowledge had to be 'derived' or 'worked out' from cognitive knowledge and was therefore different from cognitive knowledge. In that sense, metacognitive knowledge therefore was both personal knowledge and personally ordered knowledge.

Bracewell further suggested that the difference between the two forms of knowledge was also indicated through metacognitive knowledge being relatively *stable*. This was also suggested by



Baker and Brown (1984), and was an indication of how metacognitive knowledge might be commonly applicable across different cognitive areas where the cognitive knowledge will vary under these circumstances. The examples suggested by Bracewell (1983) of the stable elements of metacognitive knowledge were planning, selecting, ordering, prioritising and defining. However, these might be called metacognitive skills as they are clearly integral to cognitive activities such as reading, writing, oral presentation, problem solving and social learning. It might also be argued that some degree of planning, selecting, ordering, prioritising and defining is already part of *cognitive* knowledge and that metacognition is a *higher* level of awareness or of application of them.

Another perspective on the difference between metacognitive knowledge and cognitive knowledge concerns how metacognitive knowledge is generally viewed as involving a stage beyond cognitive knowledge. If cognitive knowledge is widespread, easily recognised and readily obtained, much of it probably remains largely unused. The *organisation* of such knowledge, which is often explained as knowing about it and being able to use it to organise and manage one's own life, is more than *having* that knowledge. This advanced state relates to metacognitive knowledge and is sometimes viewed as 'insight', that is, having personal knowledge structured and understood in such a way that clearer perceptions of the environment are obtained. Davidson, Deuser and Sternberg (1994) described the same effect in the specific situation of problem solving where metacognitive knowledge of one's own cognitive processes improved the efficiency of achieving an appropriate goal or outcome. Because this view of problem solving is often taken as having a very wide applicability in learning, as well as in everyday experiences, it is likely that insight and metacognitive knowledge also co-exist in other areas of mental activity, such as creative writing.

Finally, a proposal from Butterfield, Albertson and Johnston (1995) has suggested that it is possible and worthwhile to make cognitive theories of human development more general and this could be achieved by describing the relationships among these theories as metacognitive processes. Butterfield *et al* suggested that metacognitive understandings were concerned with cognitive operations and depended on knowing how to be aware of them and how to understand the

implications of the information gained through being aware of them. In other words, the relationship between cognition and metacognition existed within a cognitive-metacognitive framework where the distinction between the two elements was that *cognition* involved the knowledge of the world and the strategies for using that knowledge to solve problems, while *metacognition* involved being aware, understanding and being in executive control of one's own knowledge and strategies.

As with knowledge, both cognitive and metacognitive skills are centred on the same mental acts, but their function is different. Cognitive skills *permit* thinking and cognitive progress whereas metacognitive skills *monitor* the progress of applying these skills of the thinking. Each individual will possess a selection of cognitive skills for the thinking associated with a learning task, and accessing these cognitive skills (from long-term memory) would normally be carried out at a conscious or unconscious level. Selection of skills would be on the basis of the needs of the intellectual and cognitive demands of the task and these frequently would be substantially task specific. Being aware of the selection and successful application of cognitive skills is at the metacognitive level of executive monitoring and control for the purpose of regulating successful task completion.

### **Metacognitive monitoring and control (regulation)**

Regulation involves an active form of appraisal or review of the current state of thinking as it relates to the achievement of a learning outcome and so it will entail some aspect of 'judgement' on progress. The skills involved in regulation are metacognitive skills and probably include the two separate but related processes of monitoring and control.

The terminology used is not always clear and different terms have slightly different uses and interpretations, and there are instances where different terms are used for the same phenomenon. For example, Kluwe (1982, 1987) used the term 'executive processes' for what Baker and Brown



(1984) described as metacognitive skills and what Flavell (1976) referred to as metacognitive strategies. Berninger and Swanson (1994) preferred to identify these as 'metacognitive processes'.

The terms 'monitoring', and 'control' and 'regulation' have also been used differently. For example, there are instances where regulation refers to monitoring *and* control (such as Nelson and Narens, 1990) and other instances where it refers *only* to control (such as Schneider and Lockl (2002). There are texts where the terms "self-regulation" and "regulation" appear to be used to describe the same phenomena (such as Carver and Scheier, 1998; Nelson and Narens, 1990; Vermunt, 1998) and other texts where regulation is taken to reflect "external regulation" and self-regulation would refer to "internal regulation".

There is greater agreement about the meaning of 'monitoring' and 'control'. The former is widely seen as the set of procedures for collecting information about the state of thinking currently functioning within a specific thinking or learning event. During monitoring the individual must have some regard for the expected learning outcome or thinking solution and must be able to make judgements in terms of how the current state compares with the expected state. In addition to judgement and comparison skills, there might be an element of assessing the *rate* of thinking or learning progress, as an indication of the appropriateness of mental functioning for the task in hand. In such instances, the speed at which a task is tackled or a problem is solved may be taken as an indicator of success.

The control processes will frequently follow the monitoring stage (though they may be concurrent with it) and will primarily be concerned with producing a change in the thinking or learning procedures to better (or more relevantly, or more rapidly) achieve the expected goal. Control, therefore, involves relating the information gathered from the monitoring stage, to the expected progress or outcome and thereby determining any difference between actual performance and expected progress. Control processes must also be able to select from a known set of procedures (or cognitive skills) which are goal-oriented, such as to lead to a more satisfactory



pathway to goal achievement. This might include taking decisions about specific actions, or how much effort to make, or how quickly to proceed.

The relationship between metacognitive monitoring and control has been extensively studied with a substantial proportion of that work, about the judgements taken during the monitoring stage and how they impinge in the subsequent control decisions (Hacker, 1998a). More details of some of the mechanisms involved in these judgements are given in the section below on regulation. Hacker suggested that research into the links between monitoring and control appeared in two categories, one related to the knowledge individuals had of their knowledge and how accurately they could monitor that knowledge and their thought processes, and the other concerned with how individuals were able to apply learned strategies in the control environment. That appeared to suggest that research into regulation had frequently focused separately on monitoring and on control.

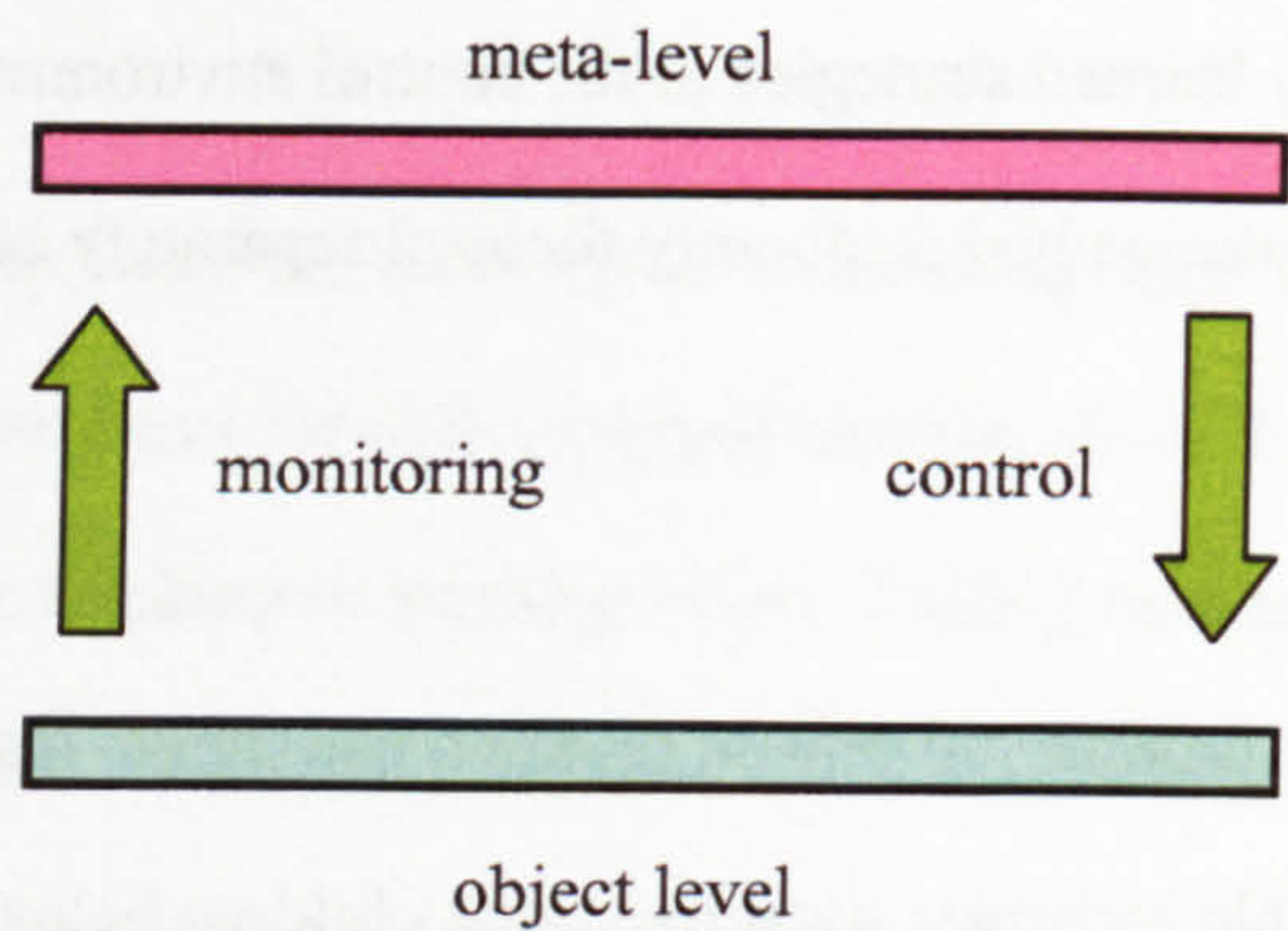
The general outcome from monitoring-related research has shown that monitoring knowledge can be gained with considerable accuracy, even by young children below five years of age (Hertzog, 2002) although it does improve noticeably with age. The ease or difficulty of the learning associated with a task has also been shown to influence monitoring, with increasing complexity resulting in increased difficulty in monitoring (Hacker, 1998a). From control-related studies, research findings have shown that when learners (again including young children) were taught metacognitive awareness of the usefulness and function of control strategies, they were able to apply them successfully and to generalise them to new situations. This suggests that teaching metacognitive awareness in schools can potentially make a significant contribution to helping children more successfully monitor their own learning. If this can be promoted to the level of *self-regulation* in learning, the gains for children in achieving autonomous learning skills will become enhanced and that would fit well with modern approaches in teacher education.

Of the theoretical models of metacognitive monitoring and control currently published, that suggested by Nelson and Narens (1990, 1994) has a particularly wide support in the literature. For



example, Son and Schwartz (2002) refer to a “remarkable consensus” (p 17) on the importance of Nelson and Narens’ theory, the basis of which is a metacognitive cycle, centred around a two level structure as shown in Figure 2.1. The two levels are named the “meta-level” and the “object level”. The object level represents the cognitive functioning of the individual during a mental act (such as problem solving, reading a text, holding a conversation, constructing an artefact, etc.) and the meta-level is at a higher level and receives information from the former. This upward information flow broadly represents the monitoring part of a cyclical routine where there could be a return from the meta-level to the object level through metacognitive control.

**Figure 2.1** Model of metacognition, (after Nelson and Narens, 1990)



For the meta-level to meaningfully receive information from the object level, Nelson and Narens suggest that it must itself contain a model of the object level. This model might be an imperfect or at least an incomplete representation of the object level, possibly because it existed predominantly to facilitate the receipt of the information from the object level. Presumably the object level is itself much more extensive and complex in that it holds all the knowledge and understanding the individual brings to bear in the execution of the mental act, whereas the meta-level contains only that information which the learner has selected as being relevant to checking or making judgements on the progress towards the expected learning outcome.

Because the object level represents or reflects the cognitive operation of the individual during a mental act, it will have to encapsulate or subsume perhaps several lower levels of previous experience and earlier cognitive operations. Nelson and Narens suggested that if this were so, these lower levels would include earlier meta-levels as well as object levels, with specific levels



acting in either mode according to the conditions. That is, a level may function as a meta-level on one occasion and then as an object level for a subsequent meta-level. This metacognitive model of monitoring and control is examined in greater depth along with other contemporary models in a following section on regulation.

Following the publication of Nelson and Narens' (1990) model of metacognition, a substantial amount of the research on the relationship between monitoring and control has taken place. For example, Hacker (1998b) has elaborated the model to explain the mechanisms of comprehension monitoring in reading. Many other research studies were about study strategies for learning and remembering information. For example, some findings suggested that learners spent longer or shorter times studying as a result of their interest in the material and their awareness of the level of difficulty of the content (Son and Schwartz, 2002). The extent to which the learner was metacognitively active, taken to be indicated by ongoing self-regulation, was reported by Son and Schwartz to be an influence on the success of current study approaches. The findings from their studies indicated that metacognitive strategies for recall could be taught and, when they were used, the time and effort in retrieving the relevant knowledge was substantially reduced with subsequent enhancement of learning performance.

There are other investigations of the relationship between monitoring and control which have been reported and they are often more domain specific, referring to areas such as to reading, writing (including handwriting) and talk. Some of these have been reviewed in the following section on metacognition in practice and this also includes a more detailed analysis of reports on teaching and learning about metacognition.





## **Part 2    Metacognition in practice**

### **The range of applications**

The application of metacognition in practice is currently a substantial research interest and Part 2 of this review of the literature gives a brief coverage of some of the relevant theory related to learning and to recent studies and investigations associated with metacognition. Reports of studies were found to relate to the more global aspects of the impact of metacognition in education (applications to teaching and learning in general), to specific educational curriculum areas (such as literacy learning, mathematics and science), and to investigations into an increasingly wide range of psychological, social and medical concerns (such as in eye-witness accounts and in the treatment of age-related medical conditions). The last of these three areas has not been included in the following review of relevant studies of metacognition in practice.

Although metacognition, as described in Part 1 of this review of the literature, is widely accepted as comprising the two areas of metacognitive knowledge and metacognitive regulation (monitoring and control), the general finding from reading the research on metacognition was of much greater emphasis on metacognitive regulation. The studies mentioned below, therefore,

target mainly the regulatory strategies which individuals use in implementing a metacognitive approach.

### **Teaching and learning metacognitive strategies**

The Piagetian theory of learning and development appears to have influenced a range of studies in relation to a metacognitive approach to learning. For example, work by Case (1980a, 1980b) suggested that promotion of the learner through each Piagetian stage required the acquisition of "executive strategies", which might be specific to any particular stage. This work also suggested that there was an important role for short-term (working) memory in the application of these strategies and that improving efficiency in their practice would lead to an increasing level of automatic application with a consequent reduction of demand on working memory.

These executive or control strategies have also been linked with Vygotsky's (1962, 1978) theory of the development of learning and cognition, particularly with regard to the progression of learning from the interpersonal level to the intrapersonal level. Within Vygotsky's proposal for a zone of proximal development, the teaching of metacognitive strategies and skills are a good example of the progression from external mediation to internal mediation. One specific example of studies examining exactly these relationships has been the work by Day, French and Hall (1985) where the supportive contribution of others, such as adults, parents, or more knowledgeable peers, was shown to promote regulation, monitoring and self assessment in learners. Similar earlier work by Karmiloff-Smith (1979) demonstrated the contribution of, and conscious control of, learners' action through hypothesis testing when taught by others and then internalised.

The suggestions arising from the earlier theories of Piaget and Vygotsky can also be identified within the proposals of Marfo, Mulcahy, Peat, Andrews, and Cho (1991) who argued that three cognitive processes were involved in teaching metacognitive strategies. In this context, they identified the role of the teacher as central in the following ways:



- to *tailor* the teaching and learning to identify and apply the correct or most appropriate strategy for the task;
- to *ensure* that the load on the learner's working memory is within the individual's manageable memory capacity, achievable by controlling the demands of the task;
- to *provide* opportunities for practice and over-learning so that the processes involved in learning can become automatic.

Marfo *et al* also proposed that there were two conditions for strategy instruction, which were most effective in promoting children's learning. They were; transferring the control of the cognitive strategies from the teacher to the learner, and making the cognitive processes underlying learning more explicit to the learner.

Making the cognitive processes more explicit to the learner can be achieved in a variety of ways, such as the activation of prior knowledge through advance organisers (Ausubel, 1963), or integrating think-aloud activities during a task completion (Stratman and Hamp-Lyons, 1994). Further work by Pressley, Borkowski and O'Sullivan (1984, 1985) examined different approaches to strategy training in an attempt to establish a link between children's use of strategies and their metacognitive knowledge or awareness of them. They concluded that the effective use of strategies could be aided by all methods of instruction, but that children were less effective than adults in deriving strategy knowledge and translating it into cognitive actions.

Other relevant cognitive mechanisms suggested by Piagetian theory include the adaptation model of accommodation and assimilation. Adaptation, and its related cognitive structure, organisation, are prime elements within Piaget's model of cognitive development and are initially biologically controlled. Piaget referred to these together as 'equilibration'. It is by this means that learners internally process information during thinking and learning and therefore this can be considered as an application of metacognitive regulation. The learning models where personal construction of knowledge and the promotion of insights are the prime targets, such as Piaget's and Vygotsky's theories and other constructivist theories of learning, all have metacognitive regulation as a central function.

A fuller analysis of the constructivist approach to learning reveals the role of teacher-directed instruction and the promotion of autonomous learning in developing a metacognitive approach to learning. Constructivist learning typically involves learner progress by means of consciously moving from teacher control to pupil control. Working with university students, Vermunt (1998) reported significant success in transferring control over the learning process from teachers to learners but in achieving this he found that the use of direct instruction was not always the best approach. He showed that the development of self-regulation strategies in students, and the activation of critical processing strategies, were best achieved through the promotion of a learning model of knowledge constructing. In this way, his students could become metacognitively engaged in their own learning, more through developing a mental learning model than through direct instruction. Duffy and Jonassen (1992) have similarly reported success in developing the skills of learners to derive their personal plans, the role of the teacher being to provide the context and the conditions to encourage learners to make sense of the learning environment so that monitoring and control become integrated into the learning process.

In teacher education, the promotion of metacognition has been identified as relevant in the area of conceptual change (Gunstone and Northfield, 1994), by which was meant promoting a metacognitive approach to interactive and participative learning about the nature and purpose of teaching and learning. Gunstone and Northfield argued that students on a teacher education course should recognise their current views and beliefs (or those held on entry to their course) in at least three areas: about the roles of teachers and learners; about curriculum content knowledge and skills to be taught; and about themselves as skilled teachers and facilitators of learning. The teachers of the course had a responsibility to help their students to evaluate these views and beliefs in terms of what had to be learned and how that learning might occur. Changing these views then became the responsibility of the students.

To achieve conceptual change, Gunstone and Northfield argued, the teachers of the students had themselves to be metacognitive in their approach and to be aware of their own views, beliefs and



approaches to teaching their students. The techniques used in the Gunstone and Northfield study were substantially modelling and discussion, and thus the students learned about curriculum content knowledge and skills through being taught, and they learned about teaching through example. The conclusion of the Gunstone and Northfield (1994) study was that many students were able to become more metacognitively informed and more explicitly aware of conceptual changes which they made during their course.

Studies of the effect of age on metacognition have indicated that younger learners (early readers, for example) were less aware of the need to make extra cognitive effort (such as in making sense of words during reading) than older learners, and that they were frequently over-optimistic about how much they thought they knew and what they could do (Brown, 1980). Despite this, it is fairly clear that all children have some ability to monitor their own thinking, problem solving and understanding. Ward, Finke and Smith, (1995) suggested that more able learners, children as well as adults, knew more than low ability learners about person-variables, such as what creative thinkers are good at. They also found a difference between the two groups in task-variables, such as knowing the demands of particular learning activities and strategy-variables, such as methods of adjusting performance to match the task.

In a comprehensive examination of studies of metacognition and learning, Osman and Hannafin (1992) identified three primary elements of instruction which influence learning metacognitive strategies: to identify strategies which help rather than hinder; to identify how to learn specific lesson content; and to develop means of using these strategies successfully. They have suggested that metacognitive strategies can be effectively taught and transferred but not simplistically or uniformly. They also indicated that social interactions play a positive role in the learning of metacognitive skills. From their analysis of the evidence, they postulated four different ways of teaching metacognitive strategies, related to the teaching approach adopted and to the context of the teaching (summarised in Table 2.2). The teaching approach involved the focus on metacognition within the context of an appropriate lesson (embedded) or wholly separate from any linked curriculum based activity (detached). The context dimension was more closely linked to the



curriculum content of a lesson and whether the teaching of metacognition was related to its particular concepts (content-dependent) or more general (content-independent).

**Table 2.2** Classification of approaches for teaching metacognitive strategies and skills, with examples (Osman and Hannafin, 1992)

	<i>Dependent Strategies</i>	<i>Independent Strategies</i>
<i>Embedded content</i>	Embedded content-dependent strategies: eg. creating a structured overview of the content presented to help identify individual learners' relevant prior knowledge.	Embedded content-independent strategies: eg. using underlining as a means of highlighting elements of the presented lesson content as well as a way of more generally examining textual material.
<i>Detached content</i>	Detached content-dependent strategies: eg. text prediction strategies and skills practised separately and later applied to reading comprehension tasks.	Detached content-independent strategies: eg. summarising, identifying key ideas, diagnosing likely areas of difficulty, self-regulating skills.

Teachers aiming to encourage embedded strategies made use of ongoing lessons to provide instruction about metacognitive strategies as part of the content-based learning environment. A significant aspect of such approaches would include a realistic setting for the introduction of the contribution of metacognition to learning. Detached strategies attempted to focus specifically on metacognitive strategies in their own right, teaching them as skills or approaches that could be applied in a variety of learning contexts or learning tasks. Employing the detached approach had an advantage in focussing the full attention of the learner on the skill or strategy being taught.

Content-dependent cognitive strategies were those required to assist the learning of a particular content, probably linked to a distinctive, and possibly unique, set of concepts which were part of a specific learning task. Content-independent strategies were those which might be expected to relate to a wide range of learning tasks. Osman and Hannafin (1992) concluded that metacognitive skills were essential in learning and that, through using these skills, effective learners were able to actively monitor and control their own learning activities. This suggested classification of teaching approaches helps to clarify how such metacognitive skills can be taught, maintained and perhaps transferred to other learning events, with a likely progression from the embedded/dependent

category to the detached/independent category with the use of the other categories as relevant or necessary.

### **Metacognition and curriculum teaching**

Reports on studies of metacognitive knowledge and metacognitive strategies in school curricular subjects have extensively covered the specific area of reading but less so for other subjects. In these other curriculum areas, Schneider and Lockl (2002) reported on an attempt to integrate strategy instruction and metacognitive information about effective strategy selection into regular instruction across language, mathematics, arts, science and social studies. In the Schneider and Lockl study, teachers emphasised, through modelling, the selection of the most appropriate metacognitive strategy from groups of strategies relevant to a particular subject area. The general finding, however, was that very few teachers were effective in this kind of activity and in the main teachers did not support metacognitive processing within their teaching.

A small-scale study of metacognition and collaborative groupwork in the primary school has been reported by Hardman and Beverton (1995) where the context was children's talk. The focus of the study was to draw children's attention to the features of talk in a group-based collaborative learning situation so that they could identify and develop the skills and attitudes relevant to successful participation in this approach to classroom learning. The metacognitive strategies which were most prominent, included: recognising when it was appropriate to make a contribution; listening to others; showing respect for others; taking turns in talking; and building on what others had said. The conclusion was that the pattern of pupil-initiated talk was strikingly different from the kinds of oral discourse when the teacher directed the structure and format of the interaction. This was particularly noticeable with the metacognitive elements of shared understanding and negotiation of meaning.



The majority of the research relating to metacognition and writing has been in relation to the process for composing texts. In much of this work, the Nelson and Narens (1990) model of metacognition has related well with an understanding of a metacognitive approach to writing, because metacognitive knowledge is relevant to writers' awareness of the writing process and metacognitive regulation strategies are a part of writing instruction.

Surveying several earlier studies, Sitko (1998) reports on the following metacognitive strategies used in writing programmes.

*Making writing procedures more explicit.* This involved guides to help writers remember the structural content of different genres in writing and the basic procedures required for the presentation of writing, such as the basic rules of syntax.

*Group or collaborative planning.* This strategy has been used with writers at all stages from young novice writers to mature experienced writers and involves the sharing of ideas for writing content as well as possibilities for structuring and presentation. The arrangements for apportioning the time spent working alone and time spent working collaboratively have varied across different writing scenarios. The role of collaborative strategies also has a substantial influence on affective aspects of the engagement in writing where writers often have reported uncertainty, disaffection and frustration with their solo writing endeavours.

*Revising.* Practice in revision has been shown to improve writers' awareness of how they might improve text. Because this can take place at several levels, from global to individual words, strategic schemes to guide writers to revise from the most general level through sections, then paragraphs then sentences and finally words, have shown that writers can carry out multiple revisions more efficiently.

*Revising with feedback.* Allowing another person to read a newly written text serves to help the writer gauge how well the writer's intentions are interpreted by a peer reader. Considerable experience of this mode often leads the writer to anticipate the reader's reaction while writing and thereby permits more successful self-directed revision before submitting it for feedback. It has also been shown that where feedback takes the form of a teacher-learner dialogue, the feedback becomes more complex because of the differing social position of each party. Overall, however,



instruction and practice in interpreting feedback would be expected to improve writers' revision skills. Theory relating to peer learning and the potential for its application are described by Topping (2001, 2002).

*Computer-assisted writing partner.* This is a special case of making writing procedures more explicit. Some of the material which has been trialled presented a structured framework for writing, covering; planning, consideration of audience, drafting, improving ideas, and revision. When computer-assisted prompts were presented without being solicited by an individual writer (as compared with the writer checking the framework to seek help), it was found that writers were able to describe their writing processes more explicitly. The outcome, therefore, was an enhanced metacognitive involvement in the writing process.

A computer-supported writing environment was also studied by Ollila, Schwartz and Francis (1993). Their sample was primary school children aged 9 - 10 years and the use of the computer was designed to assist children's writing by using editing, spelling and readability electronic monitors for the writing which the children produced. These facilities allowed the writers to devote their attention (and short-term memory) to the content of their texts. The reported outcomes for these writers were a greater sense of freedom to change and develop their original stories, and more time to spend on the higher order thought processes.

Devine, Railey and Boshoff (1993) investigated the cognitive models in both second language and first language writers and found that the major influence in effective writing was the achievement of significant metacognitive knowledge. Work with young adults whose mother tongue was not English had the advantage of focussing on competent and mature thinkers who had limited experience or knowledge of writing in that language. Consequently the finding about the relative importance of metacognitive knowledge may have been influenced by the specific needs of these learners. Whereas this knowledge was probably 'taken for granted' with native English writing students it was clear that second language writers often had a problem with a limited metacognitive knowledge base. Devine *et al* observed that, in addition to the significant importance of metacognitive knowledge, there was a contribution to their students' writing

progress from their evaluation and monitoring of their writing. This was consistent with the distinction suggested earlier that metacognitive processing probably included metacognitive knowledge and metacognitive regulation (monitoring and control).

Another study of second language students, by Kasper (1997), focussed on providing direct instruction in metacognitive strategies to promote development in writing. The sample was taught to develop, monitor and evaluate planning procedures for completing writing tasks. The data were collected using a cognitive style questionnaire and a writing biography which focused on writers' attitudes to their writing experiences to date. The Kasper study also examined student ranking of their perceptions of the importance for writing of criteria such as clarity, originality, grammar, organisation, exploration, fluency and ownership, that is, how the students saw themselves changing the responsibility for these criteria from the tutor to themselves. Kasper highlighted the value of helping learners to become more metacognitively involved in learning about their writing process and thereby become more aware of the metacognitive control aspect of writing.

The wider contribution of monitoring and control (regulation) to the study of metacognition is widely accepted and reported. The following section reviews several of the proposed theoretical models of regulation and examines some of the literature on self-regulation in writing.

## Part 3 Regulation and self regulation

### Models of regulation and self-regulation

The two terms “regulation” and “self-regulation” are used regularly in the literature, often without a clear discrimination between them. If “regulation” were taken to indicate all the circumstances which involved regulated behaviour originating *outside* the learner, it would be reasonable to restrict “self-regulation” to those circumstances and behaviours originating *within* the learner. Perhaps because of some overlap between external and internal regulation, many references in the literature to both are made under the term “self-regulation”.

An early interest in regulation began with the work of German psychologists in the 1920s and continued through to the 1950s (Span, 1995). Subsequently, the focus of research appeared to concentrate on the concerns of self-regulation, though it is clear that the role of external influences (such as a teacher) was still relevant. For example, Feuerstein (1980) demonstrated how a highly structured approach to mediation by a teacher in children’s learning is an essential element in the development of autonomous self-regulated learning. Paris and Byrne (1989) have similarly shown that autonomous learning may not be achieved solely by the learner but usually needs the help of



the teacher. These views helped to support the underlying aims of the present study - that teachers have an important role in developing regulation in writing with pupils in the primary school and that, in promoting this role, teachers themselves should be well versed in the metacognitive influences on the teaching of writing. Self-regulation in these circumstances might follow, but probably only after success in externally supported regulation.

Models of regulation (though almost always referred to as models of self-regulation) have largely been proposed with the last decade. Those outlined below have appeared regularly in scholarly texts and summaries of this area of study (for example Zimmerman, 2001; Azevedo, Guthrie and Seibert, 2004).

### **The Carver and Scheier model**

Self-regulation is described by Carver and Scheier (1998, 2000) as the process contained within a four-part loop which has as its primary elements; an input, a reference value, a comparator and an output. These are illustrated diagrammatically in Figure 2.2 and elaborated by Carver and Scheier as follows.

The *input* – this is an indication of the individual's current behaviour gained perhaps through personal perceptions or awareness by some other means, of how the individual is behaving or performing. It is a perception of the present position of the individual's behaviour on a task or in a learning environment.

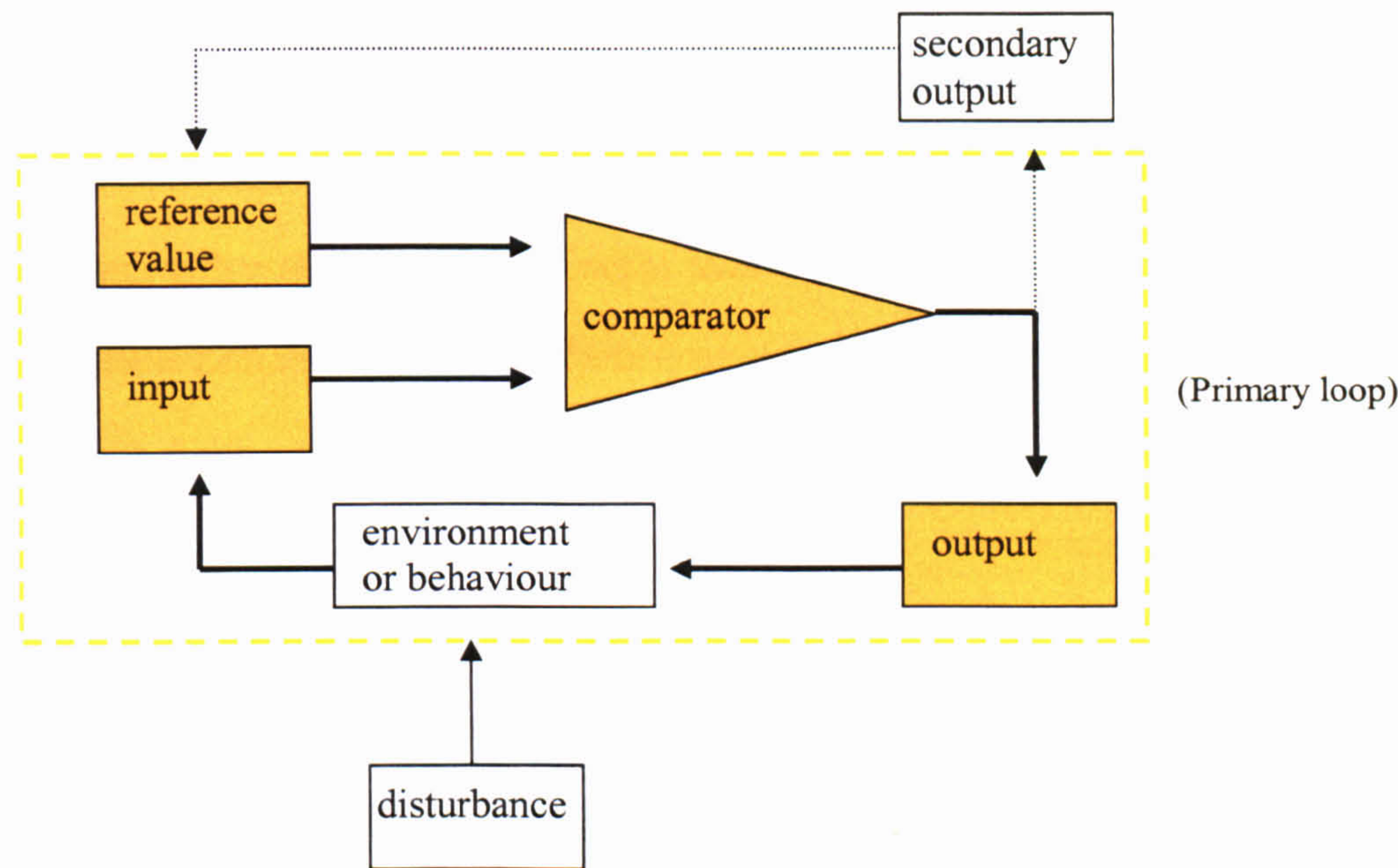
A *reference value* – this is an indication or an awareness of the expected behaviour, usually relating to a stated or inferred or expected goal. It is the standard of performance or behaviour which is relevant to the task in hand.

A *comparator* – this is an internal or mental mechanism for comparing the input (the perceived behaviour) with the reference value (the expected behaviour or goal). The comparator produces an outcome which indicates that either there is or there is not a meaningful difference between the input and the reference value.



The *output* – this is the behaviour or action which aims to reduce the difference identified by the comparator by altering the ongoing behaviour or performance. This is the controlling action which leads to an improved level of behaviour in the task or learning event that is subject to the self-regulation process.

**Figure 2.2** Model of self-regulation (after Carver and Scheier, 1998)



In addition to elements of the basic four - part loop (designated as the Primary loop in Figure 2.2), Carver and Scheier identified two further aspects of the feedback model. One, that there might be an external influence on human behaviour due to an environmental effect not resulting from the output mechanism. They termed this ‘disturbance’ and suggested that it may act to reduce the discrepancy between the initial input and the reference value. The second aspect was an alternative or secondary output which did not act upon the individual’s ongoing behaviour but had the effect of adjusting the reference value so that the meaningful difference identified by the comparator was reduced. This was likely to be a change in the expected standard of behaviour or a reduction in the demand of the goal relevant to the ongoing behaviour. These two further aspects are also shown in Figure 2.2.



Carver and Scheier suggested that, in addition to the primary feedback loop, there was a second simultaneous loop which they termed a 'meta-loop'. The meta-loop monitored how well the primary loop was functioning in reducing discrepancies. Their view was that the input for the meta-loop was a representation of the *pace* of discrepancy-reduction in the primary loop. This indicated that the meta-loop was an important contributor to the motivation of the individual engaged in a learning task because it would be through the meta-loop that the learner knew if the primary self-regulation loop was working satisfactorily or not. If self-regulation maintained discrepancy reduction at an acceptable rate, the meta-loop indicated general satisfaction, and if progress were better than expected (as indicated by the meta-loop) then the motivation of the learner would be high. The converse was also true. If the learner made slower than anticipated progress in discrepancy reduction, then the meta-loop resulted in a negative affect level with the subsequent loss of motivation. The meta-loop is not included in Figure 2.2.

The link with metacognition in Carver and Scheier's (1998) proposed model of self-regulation is obvious through the suggestion of the meta-loop. The awareness which a learner might have of self-regulation is clearly a part of the process whereby the learner is able to take regulatory action, and it is based on the metacognitive knowledge the learner has of the task and the current performance on that task. Such action has the effect of continually adjusting the learner's behaviour in completing the task to make it match more closely the intended learning outcome. Although Carver and Scheier did not suggest it, the input element may itself have included previous monitoring. There are links between this model and the Nelson and Narens (1994) model in the repeated or iterative nature of the cyclic model of regulation.

### **The Nelson and Narens model**

In the Nelson and Narens model of metacognition (shown earlier in Figure 2.1), the processes of metacognitive monitoring and control represented the flow of information between two key levels of understanding in relation to a task. The two levels, object level and meta-level, were usually



represented as a cycle, although they were later described (Nelson and Narens, 1994) as also being part of a multi-layered system. As this aspect of the Nelson and Narens model and a more detailed examination of how the basic model might function in practice, were part of one of the teaching sessions of the study associated with this review of the literature, further details are presented in Chapter 7.

Whereas the object level may have existed by itself if the learner was not engaged in any regulation, the meta-level would only exist in association with its related object level. In a metacognitive analysis, it was the cognitive level (or object level) which would be monitored to allow a representation of it to be derived at the metacognitive level (or meta-level). Nelson and Narens suggested that it was through the process of monitoring that a representation of the known goal-directed activities of the object level is created but this would not normally comprise *all* the facets of the learning situation applying at the cognitive level. That is, monitoring created a form of metacognitive summary, needed to allow the regulation process to function

In the Nelson and Narens model, monitoring was intrinsically linked with the activities that followed it at the metacognitive level although it was clear that the two could not be considered separately from each other. For instance, the monitoring process was based on the exchange of information between the object level (or cognitive level) and the meta-level (or metacognitive level) such that key elements of the former were transferred to the latter. This transfer of information was essential to the process of monitoring and provided the basis for the comparisons which have to be drawn at the meta-level. Monitoring and the meta-level appeared to be mutually dependent in this model

This view of interdependence is supported by additional research reported by Nelson and Narens (1990, 1994) where the comparisons at the meta-level were identified as *judgements* directed at the achievement of the task goal. There were four such judgements, defined as follows.

*Ease-of-learning (EOL) judgements.* These refer to aspects or items of learning, which are still to be mastered, and the judgements would relate to how easy or difficult the learner anticipates them to be. They might also relate to learning strategies which could make learning these items easier.

*Judgements of learning (JOL).* These might be expected to occur during or shortly after the acquisition of learned items and refer to the view held by learners concerning how well they believed these items have been learned (judged against an actual or anticipated review of learning).

*Feeling-of-knowing (FOK) judgements.* These also occur during or just after learning acquisition and are related to these items which are currently non-recallable but for which there is an expectation that they will be remembered at the time of a future review.

*Tip-of-the-tongue (TOT)* is the experience which concerns a person's judgement that currently forgotten information is all-but-available and will be recalled.

### **The Vermunt model**

Work by Vermunt (1998) directed attention towards the links between self-regulation and approaches to learning. He set out to examine the regulation of 'high quality learning' and argued that many of the more traditional teaching approaches had focused overmuch on direct instruction and the use of questions, directions and study tasks. In his studies, Vermunt questioned university students about their learning and found that four different types of approach could be identified.

These were related to four major learning components: metacognitive regulation strategies, cognitive processing strategies, mental models of learning and the students' learning orientations.

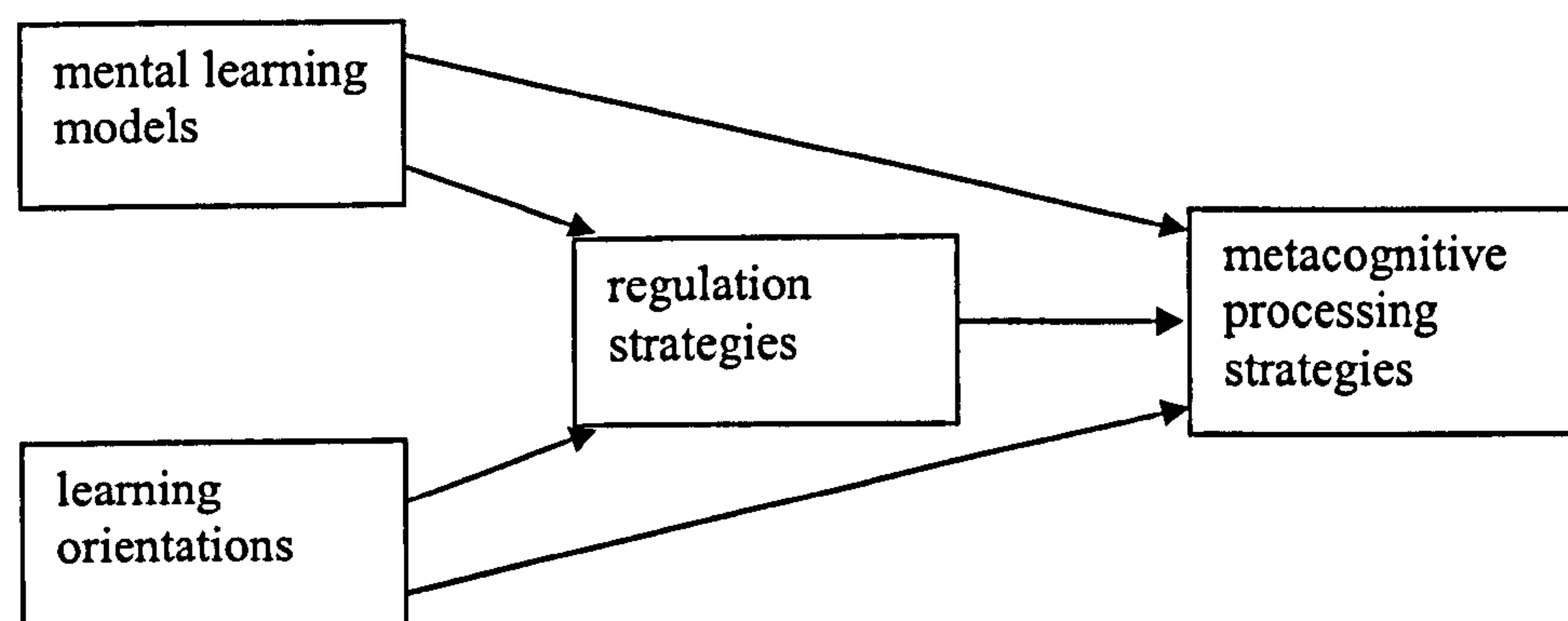
The metacognitive regulation strategies were described both as the 'dynamic' elements which included planning a learning process, monitoring its progress and examining the cause of difficulties during learning, and the more 'static' elements of knowledge, conceptions and beliefs about learning. The cognitive processing strategies were identified as the thinking activities which were used in the attainment of learning goals, such as memorising, making links, selecting key points and making personal sense of new material. Vermunt suggested that the mental models of learning were the product of wider combinations of learning conceptions which included learning



tasks, features of the individual learner, and learning methods. Finally, learning orientations covered the whole range of personal goals and expectations, attitudes (good and bad) and motives for learning. Taken together, these four learning components comprised the individual's learning style.

Vermunt's work was based on a model of regulation in learning which suggested that metacognitive processing strategies used in the achievement of a learning outcome were strongly influenced by the learner's metacognitive regulation strategies. The mental learning models and learning orientations substantially determined the learner's regulation strategies and therefore they influenced processing strategies largely by that route. This model is shown in Figure 2.3.

**Figure 2.3** Model of regulation of the learning process (after Vermunt, 1998)



In his investigation of the metacognitive processing strategies, Vermunt found that there were five strategies which students commonly used; two of which included forms of self-regulation, a further two with forms of external regulation and finally a processing strategy which exhibited no regulation. The two forms of self-regulation related either to the learning *process* or to the learning *content*, and the two forms of external regulation were linked either to the learning *process* or to the learning *results*. The students did not appear to combine the self-regulation strategies with the external regulation strategies, favouring one approach or the other. It was also found that self-regulation was positively associated with all processing strategies and that external regulation, where the students were largely directed by the learning material or directly through staff, was positively linked only with a learning strategy in which the learners analysed learning material in detail. Similarly, self-regulation strategies were associated with learning models which emphasised

constructing personal knowledge and insights, whereas the external regulation strategies were found to be linked with a learning model with knowledge intake of central relevance.

The findings of Vermunt's studies indicated that the achievement of high quality learning was positively linked with the promotion of self-regulation strategies but that some learners did not easily use such strategies. The conclusion Vermunt reached was that the role of teachers in planning for high quality learning in their students must include strong positive promotion of, and training in, self-regulation strategies.

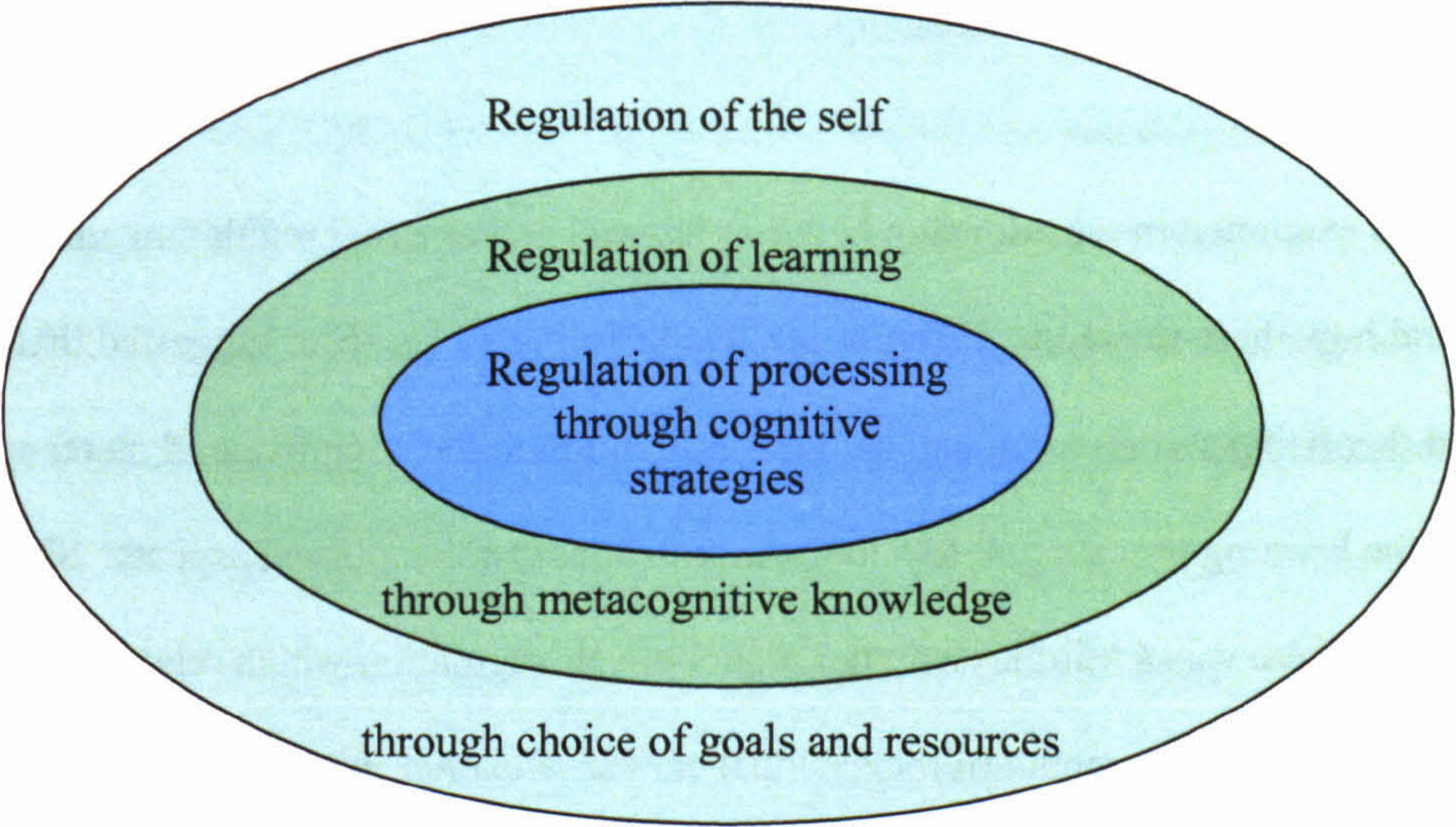
### **The Boekaerts model**

Boekaerts (1999) takes up the same question of helping students to learn through mastering the principles of self-regulation. She suggested that a generally poor understanding of the relationship between self-regulation and learning has restricted progress in understanding this area. She argued that the reason for this was partly that the construct of self-regulation, especially as it links with learning, was complex and ranged across three key areas of study; i.e. learning through cognitive strategies, learning metacognitively, and learning through self-promotion and self-selection. To help understand how these three areas might function together, Boekaerts proposed a model of self-regulation in learning which had three layers, one corresponding to each area of study (Figure 2.4).

Of the three layers of this model, the innermost represented the most common form of self-regulation where the learner was aware of, and used, choices between different cognitive strategies for the achievement of a learning outcome. This was indicated by the central or core oval in the diagram in Figure 2.4. Comparisons with the models presented above suggested that this part of Boekaerts model was also a major part of the other models of self-regulation.



**Figure 2.4** Model of self-regulation in learning (Boekaerts, 1999)



Boekaerts argued that self-regulation also involved learners using their metacognitive knowledge of the learning environment and their metacognitive skills, to regulate the learning process. This was represented by a metacognitive level which was different from the inner cognitive level of regulating learning and therefore suggested a second layer (the middle oval in Figure 2.4) where self-regulation involved metacognitive knowledge and skills such as those relating to planning, evaluating and adjusting. Together, these two layers were similar to the object level (cognitive level) and the meta-level (metacognitive level) of the Nelson and Narens model.

Boekaerts has also summarised some of the earlier research which examined the relationship between learners' metacognitive awareness and skills, and their success in self-regulating their learning. However, success in self-regulation in one area was found not to guarantee successful self-regulation in another learning context. Boekaerts expanded this argument to examine the role of internal (or self) regulation and external regulation (such as through a teacher), or a combination of both. Boekaerts argued that there were dangers of too much external regulation and yet there was the need for it with certain learners. External regulation was seen as a compensation for poor metacognitive awareness and metacognitive skills, particularly where learners lacked the knowledge and understanding relevant to their learning, and were not skilful in monitoring and evaluating. For such students the support of the teacher for regulating their learning was seen as important or even crucial for progress, but it could also mean that these learners may not develop



independent self-regulatory skills so that when deprived of teacher support they would probably cease to make progress with their learning.

Boekaerts examined the relationship between internal and external regulation adopted by learners and how these related to different personal learning styles. She suggested that much of the associated theorising and research had paid more attention to the cognitive and metacognitive aspects of the learning process and less to the motivational and emotional aspects. She therefore suggested that there was a third layer in her model of self-regulation which related to the role of the learner (or self) and took account of the personal choices a learner might make in terms of selecting learning goals and learning resources (the outer oval in Figure 2.4). This might be taken to be similar to the exercising of greater learner autonomy in engagement in learning and the identification of learning outcomes, and it is perhaps this autonomous aspect of learning which justified the “self” as a separate layer in Boekaerts’ model.

Boekaerts suggested an illustration of self-directed decisions about regulation in the context of formal or informal learning as students who were metacognitively aware of the skills and procedures involved in self-regulation in a *formal* learning situation, who were not motivated to implement them, because of their preference for a more *informal* learning situation. Conversely the learner who preferred the more formal environment may find the learning goals and expectations of the informal situation less rewarding and regulate their learning at an accordingly lower level. Self-regulation through choices of appropriate procedures was therefore strongly influenced by the learners’ personal preferences for specific styles of learning, a suggestion which was also part of the Vermunt model.

### **The Pintrich model and the Zimmerman model**

Pintrich (1999) and Zimmerman (2000) also argued for inclusion of the motivation along with cognitive components of learning within a model of self-regulation. There were three parts to the



structure of regulation in each proposal. Pintrich's suggestion was for a combination of cognitive learning strategies, metacognitive control of cognition, and resource management strategies. Cognitive strategies included activities such as rehearsal, elaboration and organisation, and together they represented a similar level of involvement or decision-making as at the cognitive level in the Boekaerts model. The metacognitive element covered both metacognitive knowledge and metacognitive control strategies, and was again similar to the corresponding level of activity in the Boekaerts model (the metacognitive level). The third part of the Pintrich model does not exactly match the third level in the Boekaerts model, but instead covered a wider range of variables such as resource management, time management, control of the learning environment, as well as the more 'self-related' aspects which Boekaerts refers to as the learners' goals.

The suggestion from Zimmerman (2000) was for a triadic relationship between *behavioural* self-regulation, *environmental* self-regulation and *covert* (or personal) self-regulation. The behavioural element referred to the task-related actions of learners and included all the strategies which were used to achieve the intended learning, such as planning, ordering or structuring the learning resource. Environmental self-regulation covered the adjustment of the learning conditions relating to the social as well as the physical environment and included discussion with others, good time management and modelling good learning behaviour of others. Covert self-regulation related to both the cognitive and emotional conditions of learning and included the use of techniques to support cognitive actions such as remembering and understanding as well as promoting affective states like motivation, willingness to learn and self satisfaction.

There was a significant difference between Zimmerman's (2000) model and many of the other models of self-regulation. Whereas most models functioned on the basis of comparing a current state against a standard state and regulating to reduce the discrepancy between them, that is *reactive* self-regulation, Zimmerman suggested that self-regulation was also *proactive* by raising learning goals and aiming for more challenging learning. The development and integration of these goal-shifting activities appeared to be linked with a strong influence of socially moderated self-regulation. Zimmerman argued that self-regulation, particularly in the early stages of learning a

new skill, was significantly influenced by the social environment, where modelling and training by teachers (and others) actively promoted self-regulatory skills.

Zimmerman also suggested that the effect of the social environment on self-regulation was itself developmental and he identified four levels of regulation. These were:

1. self-regulation through observation of an expert model,
2. self-regulation by the imitation or emulation of the expert model,
3. self-regulation by displaying and adjusting learned skills under controlled conditions (perhaps alongside the expert model), and
4. self-regulation of the learner's behaviour independently and in a range of environments.

The key aspect of the four-level development model of self-regulation was that the support of the expert model (through a form of scaffolding) was systematically reduced, although learners could continue to call upon this support if they feel it appropriate to do so. This was similar to the changing support structure in the Tharpe and Gallimore (1988) extension of Vygotsky's zone of proximal development. In the final stage of reducing scaffolding support for the learner, Tharpe and Gallimore suggest learners must be permitted to return to an earlier stage of more external support when a difficulty is experienced or when the learner feels the need has arisen.

Zimmerman (2000) indicated that the development of self-regulatory skills was enhanced (in quality and in speed) when the four levels were followed in the order of 1 to 4. He demonstrated that learners within a *practical* skill context, when taught through the observation and imitation levels (levels 1 and 2), made good progress towards performance in a controlled environment (level 3) where *process* skills were practised. When the learners reached the final level of self-controlled practice, they were able to shift their goals with greater skill and motivation than learners who had not progressed as rigorously through the developmental hierarchy.

The model proposed by Zimmerman appeared to relate closely to current teaching practices in primary school classrooms where young children will learn in the early stages by adjusting their



behaviour initially by observing, then through imitating an adult or a more mature or more experienced learner. As children progressed through the primary school, they would be encouraged to try out and regulate their learning in the controlled environment which is typical of most learning experiences in the modern classrooms. As children reached more mature levels of learning, their self-regulation should be more independent and autonomous, and would be expected to rely less on the influence of the teacher, until, that is, a difficult or challenging situation arises which demands recourse to the support still available through the teacher. From Zimmerman's suggestions, such children would be able to adjust their self-regulatory goals confidently and to successfully expand the boundaries of their learning.

### **The Piaget model of regulation**

The development model proposed by Zimmerman had its roots in a more fundamental theory of development, the Piagetian model of regulation. This had been closely examined by Brown (1987) who identified three primary types of self-regulation; autonomous, active, and conscious.

*Autonomous* regulation functioned largely at the unconscious level and was a continual process of fine-tuning any 'knowing act', and included sensorimotor as well as fundamental thinking actions. *Active* regulation was rather like trial and error regulation where the learner tested understanding of a learning environment at the concrete operational level by identifying tangible outcomes which could be compared against the learner's current theory. This tended to be 'single-event learning' which would gradually build into an awareness of a theory applying more widely to different examples. At that point, some of underlying rules or principles would begin to become apparent to the learner. Active regulation was also likely to continue through the development of these principles until the learner could reflect more hypothetically about a learning task. When this latter stage was reached, the learner engaged in *conscious* regulation where confirmation of learning was formal operational and could be implemented through thought processes which involved imaginary evidence.

The links between the stages of regulation in the Piagetian model and the more familiar developmental levels of Piaget's theory are obvious and an analysis of the four levels of Zimmerman's developmental model of self-regulation showed that there were also close parallels. Zimmerman's initial level of observation involved learners watching and adjusting their behaviour through modelling other, more experienced, individuals. Much of this regulation would be unconscious and could be taken as similar to the autonomous regulation which Piaget had suggested. The next two levels in the Zimmerman model entailed initially imitative behaviour leading to more structured regulatory activity which could involve a measure of trial and error. Both might be taken as different stages within the concrete operational level of thinking and therefore akin to the active regulation as suggested by the Piaget model. The final level in the Zimmerman model is where learners were able to apply their regulatory skills across a range of conditions, suggesting a significant element of conscious hypothesising, which was typical of the third level of the Piaget model.

### **Self-regulation and writing**

Recognition of the important position of monitoring and control in writing is prominent in the models of writing summarised in Part 4 of this literature review chapter. Hayes and Flower (1980), for example, have indicated that a greater part of the skill in writing lies in writers' ability to monitor and change their goal-directed activities. In the Hayes and Flower model, successful writers were able to switch their attention and effort between the writing processes of planning, sentence construction and checking, and the other influencing factors such as the content of writing and the writing environment. The means by which this could be achieved was through the feature called a "monitor", where the interaction between all the factors affecting writing was co-ordinated.

In the Bereiter and Scardamalia (1987) model of writing, where the two processes of knowledge telling and knowledge transforming took place, it was with the expert writers (who undertook



knowledge transformation) that self-regulation was more likely. These activities were described as mental subroutines for improving the performance of the writer and part of the achievement of this was through the development of the writer's cognitive system or understanding of the rules of writing. There was an obvious focus on the cognitive processes in achieving competence in writing in this model, as there was in the Hayes and Flower approach, although in the latter there was also recognition of the importance of the social aspects of self-regulation.

From a practical perspective of promoting or teaching self-regulation in writing Harris and Graham (1992) have argued that the development of self-regulation in writing can be supported theoretically. They have also derived considerable research evidence in support of their instructional approach to the development of strategy-teaching programmes for self-regulation in writing. Their work related to a recognition of the contribution which a metacognitive understanding of teaching and learning made to effective instruction as well as to how a constructivist approach to teaching promoted collaboration, interactive learning and reflection.

The research of Harris and Graham has shown that instruction about self-regulation should be within a context of, and alongside, teaching about the process of writing. They have included in their experimental programmes with older primary school children several key features: the promotion of a metacognitive understanding of the higher level cognitive processes in the composition of written text; the instruction of self-regulation strategies; the encouragement of children's autonomy in the application of self-regulation in writing; and support for the development of positive attitudes about children's writing and themselves as writers. Overall they have shown that the development of self-regulation skills in writing rests heavily on the interactive learning relationships developed between children and their teachers. Harris and Graham promoted an approach where the teachers acted as good and enthusiastic models providing their learners with scaffolding to help them develop and implement appropriate and relevant monitoring and evaluating skills in writing.

In their more recent writing, Graham and Harris (2000) and Harris, Schmidt and Graham (1998) suggested that self-regulation in writing functioned in two ways. They suggested that self-regulation operated through writing mechanisms such as monitoring, evaluating and revising by firstly functioning alongside the text production skills of sentence construction and the selection of appropriate genre, to *accomplish* a writing task. Secondly, these functions have a change-producing facility which could lead to adjustments being made, probably at a strategic level, in order to *effect improvements* in a writing task. They suggested that self-regulation mechanisms, through producing effective change strategies, were likely to be used repeatedly. The more successful self-regulation strategies were in improving a writing outcome, the more likely they were to be used in the future. Success in this context was likely to be judged, initially, by the teachers of writing. However, Graham and Harris (2000) hypothesised that continued success in self-regulation would lead to more successful writing, a heightened intrinsic motivation and ultimately a measure of literary achievement, at which stage success was probably indicated more within the peer group or possibly by a wider reading public.

In the promotion of their proposals for the development of self-regulated strategy through instruction, Harris and Graham (1992) and Harris, Schmidt and Graham (1998) drew a distinction between two different approaches to writing currently seen in the primary school classroom. The two methods were described in the context of American first-school classrooms but were readily identifiable in British schools as well. One was the *product-oriented* approach to teaching writing where the main focus of activity was on sentence construction and grammar, but in a context where writing was not given a high prominence in classroom teaching. In this method, strategies and processes of writing did not figure strongly and writing was presented more as a task to be completed than as a vehicle for communication. Therefore preliminary drafts were not common and most writing produced was seen (and corrected) only by the teacher. It was also suggested that teachers who practised the product-oriented approach had only a limited knowledge about teaching writing and that their preference was towards teaching handwriting skills and spelling.



The second approach was the *process-oriented* method. In this approach the writer was more at the centre of the instruction and there was significant emphasis on interactive learning between pupils and their teachers. This approach was also strongly linked with peer writing groups and ‘writing conferences’. Functional writing was a key concept and emphasis was placed on writing for identifiable audiences, writing as problem solving and writing for real purposes. Personal choices were encouraged and the writers’ ownership and responsibility for their own writing were positively promoted. In addition, writing took greater prominence in the teaching and learning activities of the classroom. The teaching of strategies, both for the process of writing and for self-regulation, was likely to become a substantial activity.

A slightly different view of self-regulation in writing was offered by Zimmerman and Risemberg (1997). As indicated above, Zimmerman’s (2000) model of self-regulation comprised three categories of processes within which self-regulation would take place. In the context of writing, one set of control processes was the influence of the *environment*, taken to include both the physical situation where writing took place as well as the social environment of writing within a group with opportunities to share with colleagues or to write collaboratively. A second set of control processes took account of the *behavioural* aspects of writing which included handwriting and presentation. The third set included the personal influences related to beliefs, thoughts, insights and understandings as well as the emotional involvement with writing, all leading to *covert* self-evaluation.

In the work of Zimmerman and Risemberg, ten forms of self-regulation within their triadic framework were proposed and they were interpreted in terms of learners’ self-efficacy beliefs. By this, Zimmerman and Risemberg meant that the extent to which learners engaged with each of these ten self-regulatory process would be reflected in their perception of how well they had performed, that is, their perceived self-efficacy (summarised in Table 2.3). The more the self-regulatory action was undertaken, the greater would be the perception of self-efficacy, probably because the more writers engaged in self-regulation the greater would be their understanding of their progress in a writing task as well as of the writing process itself. In surveying the research

which they identified as relating to each of these processes, Zimmerman and Risemberg found that writers who used one or more of the ten types of self-regulation, showed enhanced perceptions of self-efficacy, and an improvement in their writing performance. They also found that the changes resulting in enhanced self-perception also produced changes in learners' motivation to write, an observation which they felt could have significant importance for the teaching of writing in general and of the teaching of strategies of self-regulation more specifically.

**Table 2.3** Self-regulatory processes in writing (Zimmerman and Risemberg, 1997)

Environmental self-regulatory processes	1. environmental structuring – adjusting the surrounding writing environment for aspects such as comfort, distraction, etc. 2. self-selected tutors, models or books – using social sources to improve or adjust writing
Behavioural self-regulatory processes	3. self-monitoring – recording writing progress usually with related goals as a means of monitoring performance 4. self-consequences – rewarding (or not) writing progress, usually related to a pre-determined goal 5. self-verbalisation – the giving of self instructions to promote writing skills such as in spelling or composition activities
Self (personal) self-regulatory processes	6. time planning and management – taking control decisions about aspects such as when and how long to write, beginning writing and sustaining good progress 7. goal-setting – specifying intended or expected writing outcomes, usually within a timeframe 8. self-evaluative standards – specifying standards of personal satisfaction for writing 9. cognitive strategies – establishing the rules and procedures for overarching writing activities such as plans, structures and guides for drafting 10. mental imagery – developing the use of images to extend creative and descriptive writing

The self-efficacy indicator was also used in studies by Schunk and Schwartz (1993). They found that in the context of teaching writing strategies, a process-oriented approach to writing was more successful in writing achievement than a product-oriented approach. They found that when writers were given process-related goals and were then supplied with feedback on their progress in self-monitoring strategies, there was better progress in self-efficacy and in strategy learning, than when the goals were product-related. Schunk and Schwartz argued that this could not be due to the difference in the goals, as, although different, they were comparable in specificity and difficulty. The difference was also not due to strategy instruction as both groups were taught the respective strategy. They suggested that the explanation lay in the *nature* of the process goal which



highlighted the use of a strategy as a means of improving writing. Learners perceived learning about such a strategy as a useful approach to successful writing and therefore they felt they were able to make progress to write well (i.e. demonstrate a higher level of efficacy).

Providing feedback supported the learners' awareness of their progress and supported their views on self-efficacy. It seemed to Schunk and Schwartz that learners' ability to assess strategy usefulness, if successful, was also a key feature in promoting self-efficacy. Teaching children the strategies to achieve writing goals led to self-regulation of their progress towards these goals. The conclusion was that both external self-regulation (feedback from the teacher) and internal self-regulation (self-assessment) were successful motivators in achieving successful writing behaviour.

A fuller understanding of self-regulation in writing depends in some measure to an awareness and an appreciation of the nature of the writing process. Some of the theoretical models of writing help to provide this fuller understanding and they are described in the following section. The role of Short Term Memory (working memory) in regulatory processes is also widely recognised and some of the most relevant literature in the context of memory and text production is also included.





## Part 4      Models of writing

### Introduction

The multi-dimensional character of writing has occupied the attention of researchers for many decades but the current phase of interest probably began with James Britton's extensive survey between 1966 and 1971 of the uses of writing in secondary schools in the United Kingdom (Britton, Burgess, Martin, McLeod and Rosen, 1975). Since then there have been several different approaches to examining writing development. Throughout these studies and their associated models or theories of writing, the term "writing development" appears to have two possible meanings. It has been taken to mean either the *developmental process, or processes, of learning to write* or the *teaching programmes (or curricula) to promote writing skills*.

From the research that followed the work of Britton *et al*, the models relating to the writing process have been categorised in different ways. Two examples of this categorisation are those suggested by Applebee (2000) and by Levy and Ransdell (1996). Applebee's suggestion was for four approaches which he categorised as emphasising:

- the purposes for writing,
- developing fluency and control of written language,
- the structure of the final product, and
- the strategies for developing the process of writing.

The Levy and Ransdell categorisation was of three approaches based on:

- the interaction of the cognitive processes,
- writing in context, and
- the central role of working memory.

More generally throughout the literature (for example, Kellogg, 1994) there has been a broad divide into theories of writing which are cognitive models and those which are social or cultural models.

Perhaps the most comprehensive analysis of models of writing has been recently attempted by Alamargot and Chanquoy (2001). They suggest that the models, presented over last twenty five years or so, are characterised more by their heterogeneity than by their common approach and that differences between them can be seen at all levels of the writing process. For this reason, despite reviewing and analysing virtually all models of writing appearing in the current literature, Alamargot and Chanquoy were unwilling to attempt a simple categorisation of them.

### **The Britton model**

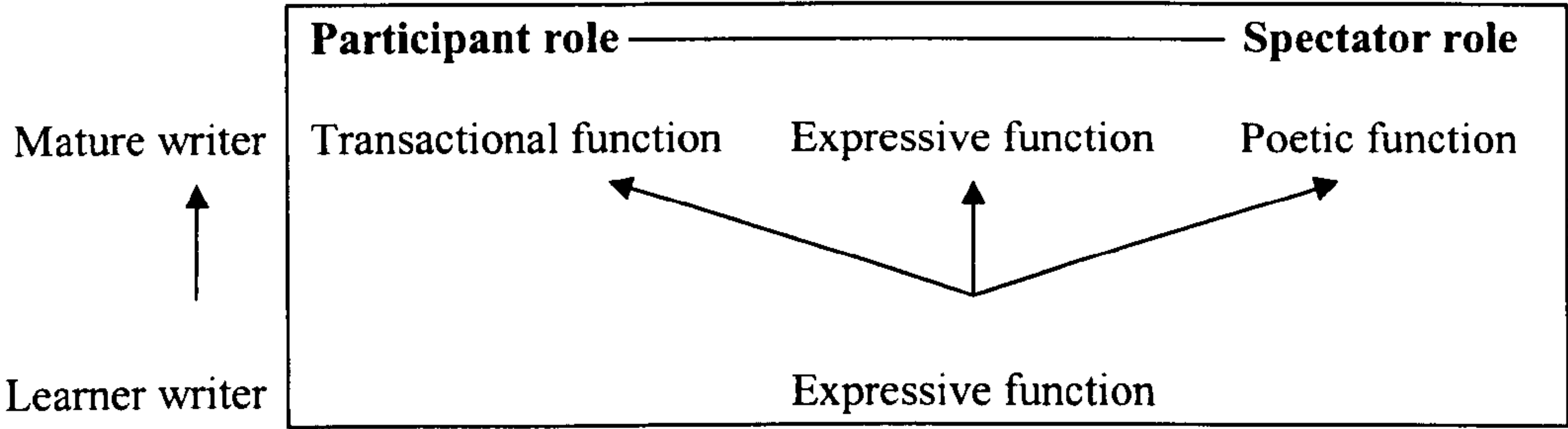
The report of Britton *et al* (1975) was based on a comprehensive study of children's writing in secondary schools. The outcome was an attempt to present a realistic explanation of the development of writing as it was taught in English secondary schools. Britton's focus was on the process of writing and the relationship between teaching writing and the subsequent writing carried out by school pupils. The concerns were less about the quality of the pieces of writing observed in the schools, than about the *processes* and *functions* of the act of writing.



Studying the processes of writing led Britton *et al* to conclude that there might be three stages involved; conception, incubation and production. Characteristic of the conception stage were the elements of selection of ideas, words and expressions, and of the level of personal involvement of the writer. The planning aspects of preparing for writing, where data were organised, structure was determined and the specific goals of the writing task were established, generally covered the second stage of incubation. In the production stage the processes involved were the psychological processes of writing or putting earlier thinking into the practical task of composing a written script.

From the evidence which Britton *et al* collected, two types of writer were identified – learner writers and mature writers. They differed in the function of their writing as summarised in Figure 2.5. The three functions of the mature writer were derived from the distinction which Britton *et al* drew between the mature writer as a participant where writing was a *means* for communication, and the mature writer as a spectator where writing was an *end* in communication.

**Figure 2.5** Functional categories of writing (Britton, Burgess, Martin, McLeod and Rosen, 1975)



The Britton model of writing was based on the evidence collected from children’s writing across the whole of the secondary school, with the result that his proposals were of categories of writing which were developmental from earlier to later years. For example, transactional writing might progress from recording what was immediately present in the environment, to reporting by selecting what to write, possibly calling upon the writer’s past experiences to make a comment on what had been selected for reporting. The development of the transactional aspect of writing might progress to the stage of being able to theorise and to make propositions or deductions about the information used in writing. Britton *et al* did find, however, that much of the writing promoted in

secondary classrooms (in the late 1960s) did not encourage the more advanced levels of writing. There was very little development into the more abstract or independent thinking forms of writing.

### **The Hayes and Flower model**

This was a model primarily concerned with the cognitive processes of writing. Hayes and Flower's original suggestion (Hayes and Flower, 1980; Flower and Hayes, 1980) followed from their work on the analysis of fluent writers (mainly school pupils) and it identified three aspects of the cognitive processes that might underlie an understanding of written text. They labelled these “planning”, “translating” and “reviewing”.

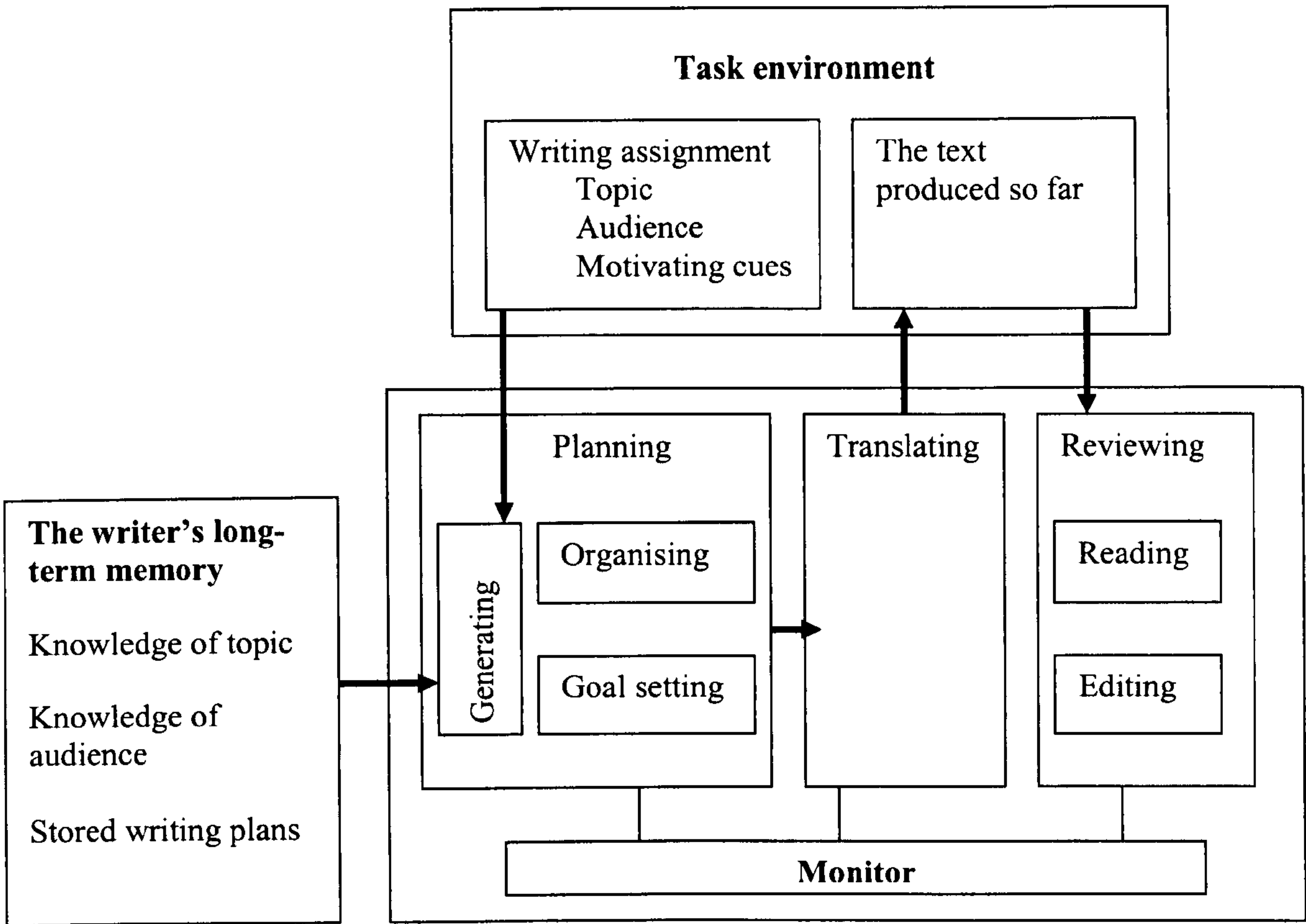
Hayes and Flower suggested that these three processes took account of the influences from two major sources, the writer's long-term memory and the immediate environment of the writing task (the task environment). The task environment was described as a wide ranging set of contributing factors outside the writer that might influence the internal cognitive processes of writing, and these included the nature of the task (topic), the motivation which might be derived from the physical as well as social aspects of the situation in which the writing is taking place (motivating cues), and the audience or intended readers of the writing in progress (audience). The task environment also embraced what the writer had already written as that might affect both what was still in the process of being written and revision of already written text. The outline of the Hayes and Flower model is given in Figure 2.6.

During the planning process, information was taken from the task environment and knowledge was retrieved from long-term memory. The planning process therefore entailed an interaction between the perceived task goals, the domain knowledge required, the procedures (or plans) which would lead to an appropriate writing output, and other relevant influences such as the needs of the reader. All these factors and influences were accessed through the generating element in the model, structured into a plan or procedure for writing within the organising element so that a set of



criteria could be established to help achieve the intended writing outcome, this being seen as the goal setting element.

**Figure 2.6** Hayes and Flower's original model of writing (Hayes and Flower, 1980)



The writer's long-term memory was seen to comprise three aspects of knowledge. The first was the knowledge relevant to the topic concerned with the writing task, the second was knowledge about the intended audience for the completed task, and the third was knowledge the writer had of previous examples of appropriate structures or plans for the type of writing relevant for the task in hand. All of this information was retrieved during the planning process. Hayes and Flower suggested that the planning process was the first of three *general writing processes* involved in producing a written textual product. The second was described as translating the relevant domain knowledge on the basis of the constructed plan. Hayes and Flower (1980) suggested that the translating process included accessing knowledge from long-term memory, linking it with the relevant part of the writing plan and composing it into correct written text. The third general writing process was a reviewing process where the appropriateness of composed text would be

judged according to the criteria established within the planning process. This would be implemented through reading and editing what had just been written.

Finally, within the Hayes and Flower model there was a control process (the monitor) where the activation, involvement and interaction of the three processes of planning, translating and reviewing were managed and regulated.

The Hayes and Flower model of writing has been widely quoted in the literature as the beginning of the recent phase of studying the psychological and the mental processes of writing, Zimmermann (2000) refers to the model as “most influential” in language research and the mental *processes* of writing although it has Alamargot and Chanquoy, (2001) have argued that it made less of a contribution to the study of the *procedures* of writing.

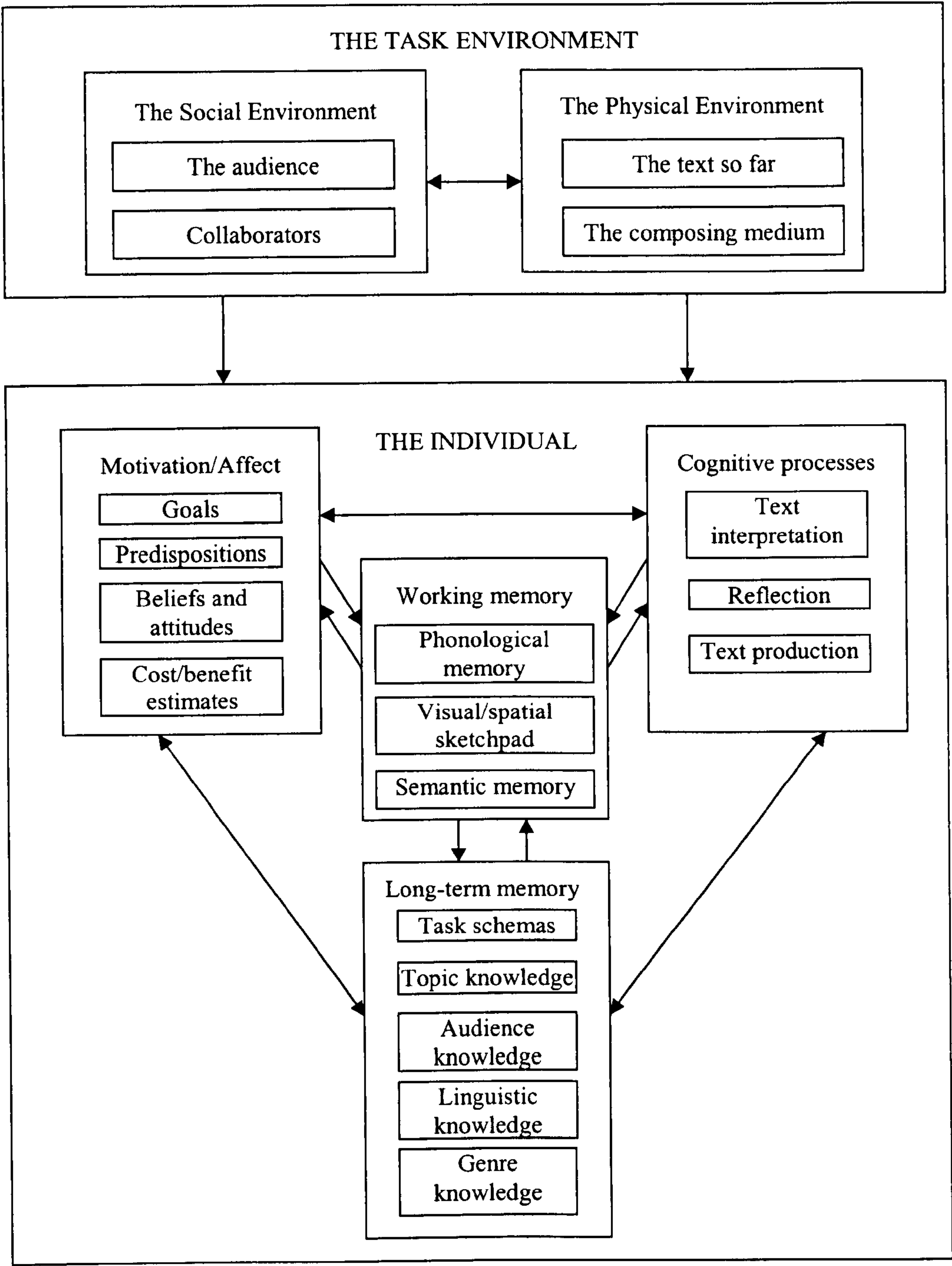
### **The Hayes revised model**

A revision of the Hayes and Flower model was proposed by Hayes (1996) through restructuring the original (1980) model to comprise two major components; the task environment and the individual. The writing processes were substantially restructured, as was the nature of the knowledge involved in a writing activity. The role of short-term or working memory became a central feature of the revised model and the writer’s motivation was given an equal role alongside the cognitive elements. The revised model is shown in Figure 2.7.

In the revised model, Hayes elaborated the role of the individual in a writing environment, laying greater emphasis than previously on the social aspects of the writing task. He recognised that the limited emphasis on this aspect of writing in the earlier model had not reflected the importance of the collaborative aspects of writing. Writing was therefore to be promoted not only as a set of cognitive activities but also as a social activity embracing the influences of social conventions, individual social experiences, and social and cultural differences of individual writers.



**Figure 2.7** Hayes’ revised model of writing (Hayes, 1996)



In the area labelled “the individual”, the Hayes (1996) model located working memory as central to all of the other processes. Hayes suggested that this was where the cognitive acts which make up the writing process were carried out and, in this regard, Hayes’ suggestions are very similar to those Baddeley (1986) expressed in his general model of working memory. In Baddeley's model, (effectively replicated in the Hayes (1996) revised model of writing) executive

control of information from long-term memory requires that further specific attention be given to particular cognitive processes, possibly because these processes are not going to become engaged automatically. Relevant information about these cognitive processes, and the rules governing their engagement, are held in long-term memory and can be accessed through working memory when prompted by the executive control function.

There is a clear parallel between Baddeley's executive control function and the mental actions suggested by Tharpe and Gallimore (1988) in their extension of the automaticity stage of Vygotsky's Zone of Proximal Development (Vygotsky, 1978). Tharpe and Gallimore suggested that, on occasions, the individual learner finds that mental activities cease to become automatic, perhaps through experiencing a difficulty in learning. This difficulty results in 'deautomatisation' of the current mental activity and the introduction (or reintroduction) of the executive control of problem solving task at the point where the automatic processing has become unsuccessful. Tharpe and Gallimore present this reintroduction of control as a recursive loop, taking learners back to a level where conscious 'assistance' (or scaffolding) is available, probably provided by the learners themselves but occasionally also including support from an external mediator. Where the learners draw upon their own resources to self-regulate, attention is focused on the relevant knowledge and experience held in long-term memory. Engagement of these resources will occur to address the learning task, in a way similar to the operation of the executive control feature described in Baddeley's (1986) model of memory in learning.

In addition to the central role of working memory in Hayes' revised model, the individual element comprised three other major parts; the writers' *cognitive processes*, their *long-term memory* and the *motivation* which supports their writing. The first of these, the cognitive processes, had been changed from the earlier Hayes and Flower model through replacing the planning aspect with a more general process under the heading of "reflection", including transformation within the wider realm of text production, and replacing reviewing with an activity called "text interpretation".



Text interpretation, also referred to by Hayes as “text processing”, was made up of the cognitive activities involving the creation of internal representations from the linguistic and graphic content of the specialised phonological and visual-spatial memories respectively. It was suggested that these cognitive activities involved writers in creating a personal picture of what they wanted to write, in terms of what it might sound as well as look like. Hayes likened this to the way the reader created a personal representation or image during a reading activity. This form of imagery has been more extensively studied and reported in the context of reading (de Beaugrande, 1980), but there have also been studies in the context of writing (de Beaugrande, 1982; Lewis, 1998).

An interpretation of the cognitive processes in Hayes’ (1996) revised model suggested a structure where text interpretation was followed by reflection and then by text production. It has not been made clear, however, if these processes occur separately, in unison or consecutively. Hayes has suggested that reflection was the cognitive activity which acted upon internal representations to produce new representations through intellectual process such as decision-making, problem-solving and making inferences. However the overall interaction between the three cognitive processes given in the Hayes model was seen as a complex one with likely multiple interactions between all three elements during the writing process.

The place of long-term memory in the revised model was more integrated to the writing process than in the earlier model. Long-term memory interacted directly with the cognitive processes used in writing and the motivation of the writer. It also contained more knowledge categories than previously, five instead of three. They were: the knowledge associated with procedures for writing (“task schemas”); the content knowledge (“topic knowledge”); the knowledge about the intended reader (“audience knowledge”); knowledge about constructing a piece of writing (“linguistic knowledge”); and knowledge about the style of writing (“genre knowledge”).

The motivation element has been emphasised in the revised model so that it is presented at the same level of importance as cognitive processes and memory. The central themes of motivation were the writer’s needs and awarenesses about a commitment to writing and the beliefs and

attitudes relating to the context of any single piece of writing. Motivation has been moved from the external influences on the writer (the task environment) to the internal influences (the individual), possibly indicating a shift in Hayes thinking, reflecting the relevance of intrinsic motivation in writing

The *task environment* in the revised model has been subdivided into the physical and the social aspects of writing. In the social element, Hayes has enhanced the relevance of “collaborators” through recognising how the development of writing skills is currently promoted by shared talk and discussion with the teacher and with other children in the classroom. Hayes also argued that if imagery played a part, at either content or process levels, sharing with a peer group, in an open and interactive fashion, was likely to be a significant development factor.

The final element in the revised Hayes model is the physical environment. This comprises two parts, “composing medium” and “the text so far”, and Hayes proposed that both of these functioned as a form of control structure, partly to influence (and support) what was being written, but also for the revision of ideas and expressions already written. Hayes appeared to lay great store by revision and elaborated a model of revision to identify how the cognitive processes of writing might be involved with this activity. The composing medium was taken to cover all the influences *external* to the writer that might have an effect on the writing output, such as the conditions for writing and the appropriate surroundings to enable writing to take place.

The revised Hayes (1996) model of writing was a central part of the teaching in this study and further details are provided in Chapter 6.

### **The Scardamalia and Bereiter model**

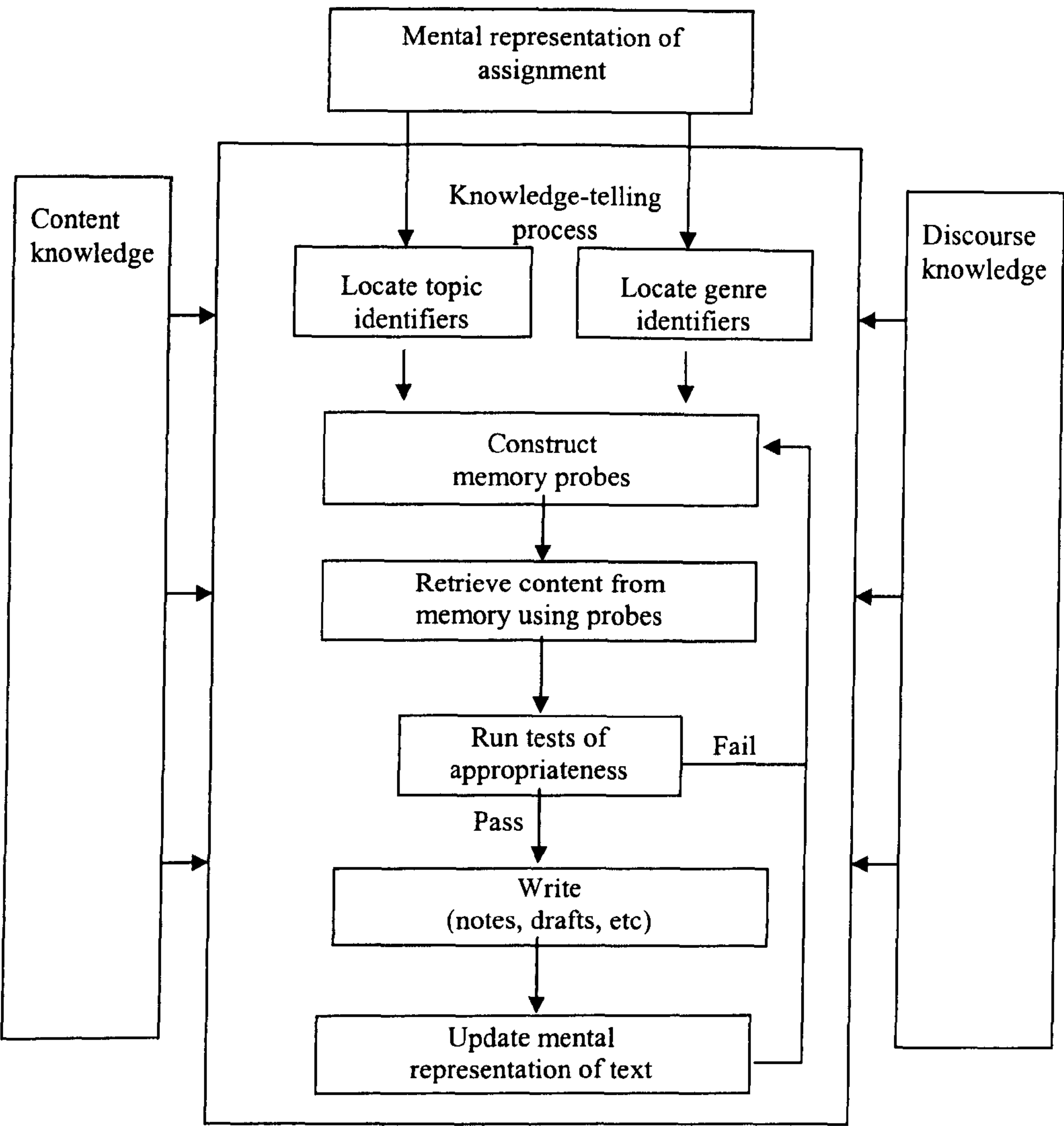
Like the original Hayes and Flower (1980) model of writing, the work of Scardamalia and Bereiter produced a cognitive model of writing. Scardamalia and Bereiter claimed, however, that their



attempt was to move beyond the previous models of writing which had largely been directed at a universal description of “the composing process” applicable to *all* writers (Bereiter and Scardamalia, 1987; Scardamalia and Bereiter, 1987, 1991). The specific contribution of Scardamalia and Bereiter model was that it focused on the *differences* between what novices and experts did when writing. Two models of writing were therefore produced, one to describe the features of novice or immature writers and the other to elaborate the features which distinguished expert or mature writers. These models were referred to as “knowledge telling” and “knowledge transforming” models of writing. The general interpretation of these two models was that they were at the opposite ends of a continuum of the writing process. Novice writers might (under appropriate conditions) progress from knowledge telling through intermediate strategies to knowledge transforming as they became more expert in their writing, although for some writers this would not occur.

The *knowledge telling* model was an attempt to explain how the novice writer undertook to produce text, given the content area and a familiar genre. It proposed that the writer did not need an overall plan or a means of resolving problems in order to produce a piece of written text. The writing process described by this model started with a mental representation of the writing task which was extended and updated as the writer proceeded through the writing activity. In the model, there were two types of knowledge available to the writer from long-term memory, content knowledge (knowledge about the topic) and discourse knowledge (knowledge about how to write). The content knowledge related to the topic or domain with which the writing was related and contained all the relevant past experiences of the writer which could be used in the creation of new writing. Discourse knowledge included the knowledge about the rules of writing and the awareness which the writer had about writing procedures and different writing genres. Both forms of knowledge were available to the writer through long-term memory as shown in Figure 2.8.

**Figure 2.8.** The knowledge telling model of writing (Scardamalia and Bereiter, 1987)



The means by which knowledge from long-term memory might be brought into action was through the “knowledge telling process” which comprised seven stages. The first two of these, referred to as identifiers, were seen as directly linked with the writer’s mental representation of the task and enabled the writer to focus on (and therefore identify) the specific knowledge relevant to the writing task in the domain and the discourse knowledge areas, respectively, of the writer’s long-term memory. Accessing the relevant knowledge was then through “memory probes” which might be words or ideas which could be used to stimulate recall of further ideas and recollections held in long-term memory. The recall process was the next stage in Scardamalia and Bereiter’s model, and the product of this was a test of appropriateness for the writing task in hand. If the ideas retrieved were not appropriate, new ideas (as memory probes) would be constructed and reapplied. If the material retrieved was deemed to be appropriate, they were used in the writing



activity to produce new text. The final stage was the updating of the writer's representation of the task through seeing if what has been written matched the task.

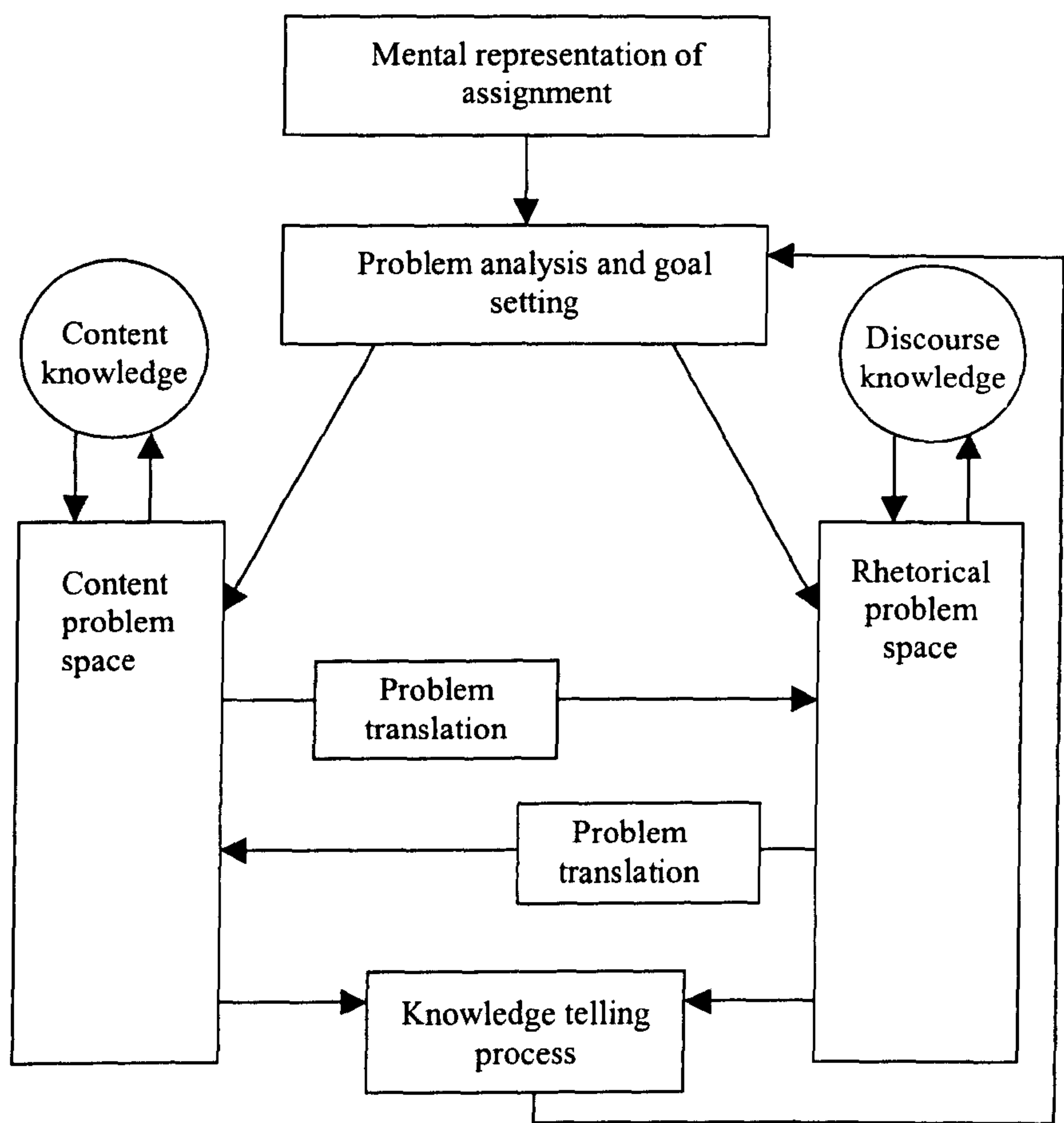
In an examination of the Scardamalia and Bereiter model of writing, Anderson (1983) proposed that the identifiers functioned as the means of accessing information in long-term memory through the process of "spreading activation" which prioritised information most closely linked to the immediate context. In this way, the first information which became available to the writer and therefore was used by the writer in completing the task was most closely related to the topic. Anderson suggested that accessing the most relevant knowledge reduced the need for constant monitoring and for the novice writer, also removed, or at least diminished, the need for planning to keep on task. As the writer created the text using the most readily available knowledge, the consequent updating of the mental representation of the task permitted the writer to create new memory probes to look for the next most relevant knowledge for inclusion. Thus the process of accessing additional knowledge from long-term memory continued in a linear fashion, but retained significant on-task coherence and relevance.

Scardamalia and Bereiter suggested that these processes functioned largely at an automatic level and resulted in the writer producing a written text but without much reorganisation of the domain knowledge. Coherence between the ideas recalled from long-term memory was seen as at a low level, probably not much more than in terms of the links between one idea and the one immediately following.

With a mature or expert writer, the knowledge telling process had become embedded into the larger model of *knowledge transforming*, but the two processes have not been so directly linked that knowledge telling would always develop into knowledge transforming. In the knowledge-transforming model, mental representation of the task remained as the first element, to permit the writer to comprehend the nature of the intended writing. The two knowledge areas present in the knowledge-telling model were also present in the knowledge-transforming model, namely content knowledge and discourse or rhetorical knowledge. The function of these two elements was

different, however. The knowledge telling process (elaborated into seven stages in the knowledge telling model) also remained, but with a substantially extended role. The major difference between the two models, however, was the knowledge transforming strategy comprising a complex set of interactions between the mental representation of the task and the knowledge telling process. The focus of this set of interactions was the knowledge areas and interactive links between them (see Figure 2.9).

**Figure 2.9.** The knowledge transforming model of writing (Scardamalia and Bereiter, 1987)



With the expert writer, the knowledge areas were proposed as “problem spaces”, a content problem space and a rhetorical problem space. The concept of a problem space was proposed to permit the functioning of a further element, “problem solving and goal setting”, which permitted the writer to analyse the writing task and to establish plans with identifiable goals to be met, thus allowing the writing task to be satisfactorily completed. Scardamalia and Bereiter indicated that there were two types of problem to be solved, those associated with content and addressed in the



content problem space (what to include) and problems associated with the telling process to be addressed in the rhetorical problem space (how to write it). Although the two sets of plans were addressed in their respective spaces, it was a basic belief of the knowledge-transforming model that the two problem solving activities worked in close conjunction.

In the content space the writer's knowledge was transformed, through restructuring, expanding and elaborating current knowledge. In the rhetorical space the problems and the goals of what the text is trying to achieve were addressed. The relationship between these two spaces is at the heart of knowledge transformation in that there has to be an interaction between the two spaces, at a fairly continuous level. Problems encountered in either space could become tasks to be undertaken in the other. For example, Scardamalia and Bereiter suggested, if a problem of expressing a belief arose in the rhetorical space it became the task of the content space to derive some new examples to provide a better illustration of the belief. Similarly if a problem arose in the content space, such as the complexity of content, the finding a solution would be attempted in the rhetorical space by deciding how to present the material to aid its understanding. These processes are indicated by the problem translation elements in Figure 2.9.

In comparing the knowledge-transforming strategy with the knowledge-telling approach, if the writer identified that something just written was acceptable but a bit vague, the novice writer, following the knowledge-telling model, might be expected to look for another idea from his long-term memory. The mature writer, following the knowledge-transforming approach, might be expected to examine his rhetorical plan or goal and look for a fresh approach which had an expectation of being less vague without it detracting from the successful writing up to that point. Further, the exchange between the content space and the rhetorical space was seen as relatively continual, as the mature writer attempted to resolve rhetorical and content problems in the completion of a piece of writing. Such an exchange would not happen with the immature writer following the knowledge-telling approach.

Consequently, writers following one model are not the same as writers following the other. Scardamalia and Bereiter presented evidence for the existence of both models. For example, they quote several instances of expert writers who claimed to undertake some form of knowledge-transformation resulting in the writer's awareness of writing as a process of discovery. They indicated that immature writers reported no such effects from their writing, tending rather to see writing as a means of expressing what was in their mind. Scardamalia and Bereiter proposed that in some instances a mature writer would develop from a novice writer and thus move from one model to the other, but not always. They also suggested that individuals who became successful mature writers with a fully-fledged knowledge transforming approach might tackle writing differently at the beginning. Such writers would not pass through the knowledge telling stage.

In a school context, it is not yet clear if knowledge-transforming techniques can be taught although one area where this has been examined is revision in writing. Although Scardamalia and Bereiter do not propose a separate model of revision, they have shown (Bereiter and Scardamalia, 1987) that it was possible to effect greater revisional change through instruction. Such revisions, however, appeared to be more at the knowledge-telling level than at the knowledge-transformation level.

There might be another argument, however, based on how the two models, knowledge telling or knowledge transforming, could *predict* a role for revision. If revision were to be successful, it would require goals and plans such as may not be present in the knowledge-telling model but would be in the knowledge-transforming model. There might therefore be greater reluctance in immature writers to undertake revision than there would be with more mature writers. According to the Scardamalia and Bereiter model of writing it could be predicted that novice writers would be less able to revise and therefore would require more help in developing a set of procedures whereby revision might be significantly achieved.

Another view of expert and novice writers has derived from the work of Dreyfus (Dreyfus and Dreyfus, 1986; Dreyfus, 2001) where a 7-stage model of learning has been proposed. Although the



work of Dreyfus is not widely reported in the literature on metacognition, the views proposed present a valuable additional perspective. Within the stages which Dreyfus identified was that of the novice, requiring the teacher to supply the information to be learned and the rules which will aid learning to take place. A later stage, the expert, was described as relating to the learner who is much more aware of the learning situation and could see how the learning goals might be achieved. The descriptions suggested by Dreyfus have probably not yet been applied to writing but they could help students and teachers to identify some of the practical differences between teaching writing to younger pupils compared with teaching more capable writers of later school years.

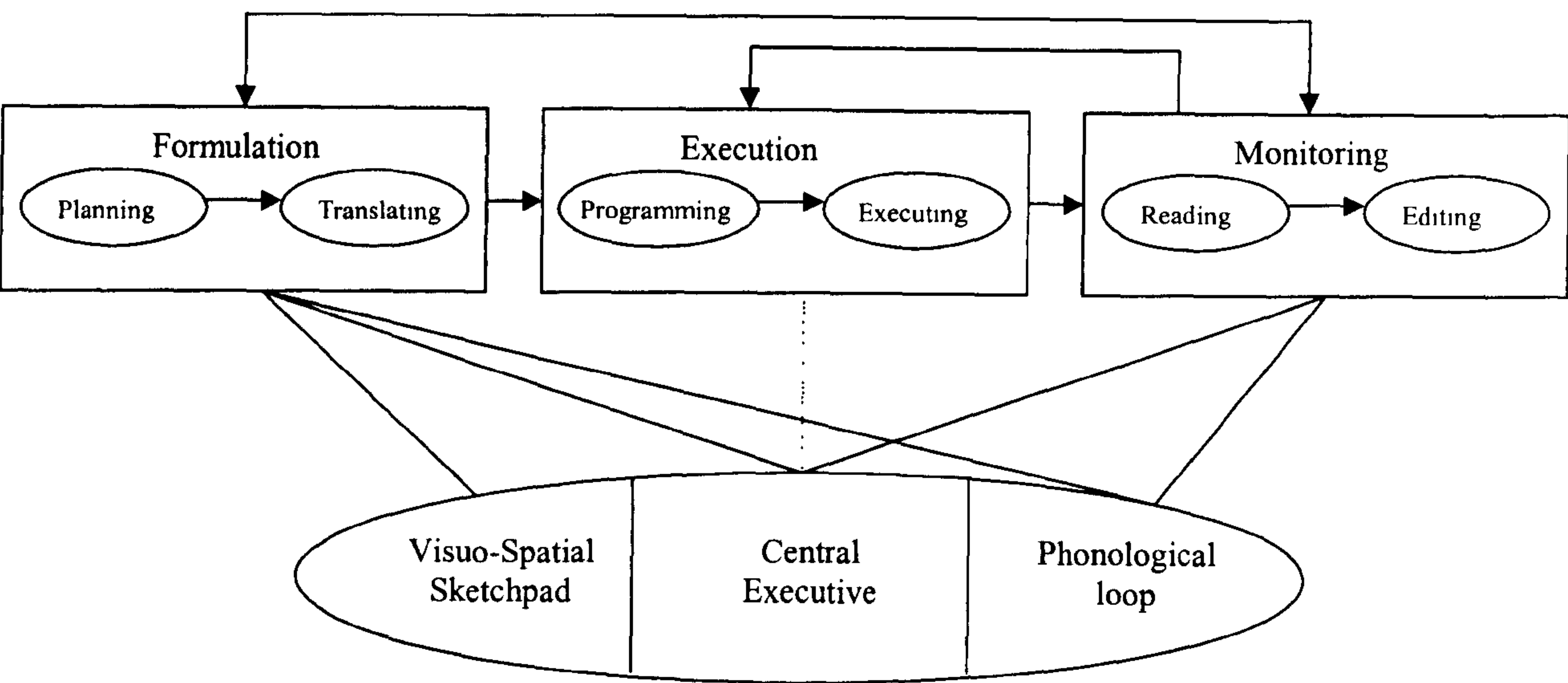
### **The place of working memory in models of writing**

The most prominent considerations of the place of working memory in models of writing have been developed relatively recently, significantly since Kellogg proposed a new model of working memory in writing (Kellogg, 1996). In this model, Kellogg suggested an integration of the processes of writing with the model of working memory previously proposed by Baddeley (1986). The processes of writing suggested by Kellogg were the text production aspects of *formulation*, *execution* and *monitoring* as shown in Figure 2.10.

The formulation process comprised planning and translating where the writer was expected to set out the goals for a writing action and to think about ideas related to these goals. The ideas would be partially translated and tried out mentally as sentences without putting them into a written form. Kellogg likened this to the inner speech proposals of Vygotsky. The execution process included the sub processes of programming and executing. This involved the reproducing the product of earlier translation activities by handwriting or typing (or even dictating). In the terminology of Kellogg, the message which has been created during the formulation process has become available (that is, “executed”). The third process was monitoring and involved reading and editing. The reading sub process allowed the writer to read over what has been written and this was regarded by Kellogg as “a necessary, but not sufficient, condition for writing well” (Kellogg,

1996, p 61). Editing was interpreted as a comparison between what has been written and what had initially been intended.

**Figure 2.10** Model of text production process and working memory (after Kellogg, 1996)



In Kellogg’s model there was a precise relationship between the writing process and the different components of working memory. The Visuo-Spatial sketchpad was taken to be the holding (or storage) area for ideas before they could be processed in the Central Executive area, but the translation of ideas also required the Phonological loop of working memory. The execution stage was seen as requiring only the Central Executive. The reading and editing process required both the Articulatory (Phonological) loop and the Central Executive. Alamargot and Chanquoy (2001) suggested that the close relationship between the processes of writing and the areas in working memory, such as proposed by Kellogg, was an important contribution to being able to examine, in practice, working memory restraints on implementing writing.

The evidence from many years of study of memory has already shown that working memory, often referred to as short-term memory (STM) is very much more limited than long-term memory (LTM) but still much is unknown about how knowledge in LTM is accessed and used in STM for writing. It seems that the features of these two memories apply to the writing process in the same way as they are believed to function in other mental actions, namely that working memory is the store for current knowledge and is also the working area for the application of the mental activities



relevant to the focus of current attention (such as writing). There is little doubt that STM is very much more limited in terms of capacity than LTM, and that information will be held in STM for only a relatively short time before it is lost through decay or interference from new information. There is widespread acceptance that STM is the working 'space' for conscious mental activity and that LTM is store for knowledge which is not currently active and anything recalled from LTM is available only in STM. Working memory is therefore where retrieved previous knowledge about learning skills is held while needed for present tasks, usually without it being recalled consciously.

The two main functions of memory in writing are storing and processing. The requirement for a short-term memory store is based on the limited nature of human attention. Individuals cannot easily attend to more than one mental activity at the same time and for most people there is also a very short limit to the length of attention span for any single activity. The storing activity is different from the processing activity of working memory and it is during the latter that the mental activities associated with writing (the cognitive writing processes) will take place. Because there is a limited "space" or capacity in working memory, there has to be a balance between storing and processing, although that balance can change according to circumstances and demand. Thus there is a continual "juggling" of memory facilities to meet the needs of knowledge storage and the processing of that knowledge required for the cognitive demands of the task in hand. Although this juggling of space will be in operation for all writers, it has been shown to be particularly relevant with skilled writers (McCutchen, 2000).

With novice writers there is less evidence for juggling priorities between the need for knowledge storage and its cognitive processing within the limits of STM because the activities of novice writers are more directed at getting ideas down (directly) as they are retrieved from LTM. For example, in the Bereiter and Scardamalia (1987) model of the novice writer, knowledge transmission is the main activity and the demand on STM from other activities is reduced accordingly. This was expanded by McCutchen (2000) who suggested that novice writers were more constrained by the limits of working memory (STM) than expert writers, presumably because such a large proportion of available memory was used with either the transmission of content

knowledge or with the retrieval of discourse knowledge. The availability of memory space did not allow both to take place together. Accordingly, McCutcheon suggested that the most significant difference between the novice and the expert writer was the differences in their knowledge and their fluency of text-generation skills with the consequent demands of each on STM.

Because of the limitation of STM, novice writers require the bulk of the available working memory space to cope at the less fluent level of text creation and they are unable to access as readily as the more expert writers, the knowledge sources held in LTM. For novice writers, STM is taken up very largely with the transcription processes and consequently the facility of getting ideas from LTM is much reduced. These writers therefore rely more than expert writers on the previous sentence they have written or the title of the writing task, each of which is visually prominent and in close proximity (both temporally and spatially) to the current transcription task. A diagrammatic representation of this interaction between LTM and STM was used during a teaching session in this study and is given in Chapter 9 (Figure 9.1).

With regard to the use of memory, the expert writer gains in two ways over the novice writer. First, the expert writer has better developed skills in text production and therefore has to devote less of the STM space to bringing them into play in a writing task. This makes STM available to access the knowledge sources in LTM, which themselves are likely to be more extensive in the expert than in the novice writer. The second consequence of being an expert writer is that their expertise enables them to make links between STM and LTM which are relatively stable and allow the expert writer to use LTM as an extension of STM, something there is little or no likelihood of the novice writer doing. Therefore, not only do expert writers have greater opportunity to use LTM knowledge because STM is not so engaged with the processes of transcription, they are also able to work with LTM knowledge in a transformative way by creating links between STM and LTM. These links are a form of organisational partial structuring of LTM knowledge at the STM level so that it can be accessed from LTM on demand and very rapidly. Ericsson and Kintsch (1995) proposed that this be referred to as long-term working memory (LT-WM).



Research on the knowledge which is held in LTM and which contributes to writing has indicated that it is largely in two domains; genre knowledge and topic knowledge (McCutcheon, 2000). In both of these forms of knowledge, expert writers both have, and have access to, a more extensive knowledge than their novice counterparts. Bereiter and Scardamalia (1987) have shown that for novice writers, the knowledge telling strategy employs genre and topic cues to make links (probes) with LTM. The explanation offered is that although novice writers might not be able to use long-term working memory in the way the more expert writers would, they can still use their genre and topic knowledge to influence their writing. The ease and facility of such access are at a lower level than they would be with expert writers.

In addition, McCutchen (2000) examined the role of text-generation skills and concluded that without fluency in these skills, writers could not make fuller use of short-term memory while participating in the act of writing. McCutcheon suggested that the implications of this for teaching writing must be to structure writing events for novice writers so that their spells of text generation would be interspersed with spells of non-writing when the focus would be on searching for ideas about what to write. These non-writing events would permit the writer to bring knowledge from long-term memory into short-term working memory where some of it might be retained for the next writing event.

Research evidence (Daiute, 1983) has confirmed that older children and college students can also lack fluency. These writers, referred to as “basic writers”, were found to experience memory limitations which made it difficult for them to avoid or later correct spelling, grammatical or sentence construction errors. Part of the explanation of this was that as basic writers produced more words in their writing, these would intervene between the key constituents of writing such as the application of spelling and grammar rules, in an already limited short-term working memory.

As a consequence of understanding better the relevance of the function of short-term or working memory in writing, its importance for the teaching of writing is becoming recognised. Graham and Harris (2000), for example, have shown that the transcription skills of poorer writers can be

improved by instruction, resulting in overall improved writing. It has been recognised that further attention should be given to improving novice writers' text production skills to reach a stage of significant fluency. However, instruction for improving these skills has to be designed to make minimal demands on short-term working memory, through the use of *external* supports such as primers, task lists, and memory aids.

Metacognitive awareness of writing is also apparent in a suggestion by Graham and Harris (2000) who indicated that novice writers were less involved at a metacognitive level and the expert writer was more so. They supported this suggestion by examining the writer's ability to draw meaningful and usable links between STM and LTM which led to the consequent demonstration of the writer's greater metacognitive knowledge. Graham and Harris also suggested that the ability to undertake text processing that involved planning and reviewing, and which called upon relevant extensive knowledge, was also more significantly metacognitive in nature. Each of these trends was taken to indicate a greater metacognitive awareness as a feature of expert writers than of novice writers.

The links between memory and metacognition are well known, with the first use of the term "metacognition" being in the context of metamemory (Flavell, 1976) but it is noticeable that, in the models of writing summarised above, the role of metamemory or metacognition through memory, is given little explicit mention. Nevertheless, the links can be drawn. Teachers of writing should be able to identify the relevant knowledge for writing (content and discourse knowledge) which their pupils must hold in long-term memory. Teachers should also recognise the monitoring and control aspects of textual processing which take place in short-term working memory and the subsequent differences which will affect the writing activities of novice and expert writers. These are some of the metacognitive awarenesses which teachers of writing might be expected to have.

It seems reasonable to assume that teachers of writing have to be expert writers (or at least not basic writers) and have to both understand and demonstrate relevant metacognitive knowledge and regulation skills as each contributes to expert writing. Perhaps the development of this expertise is



one way in which it is possible to promote a metacognitive approach to teachers' own writing and this in turn should help them become more competent as teachers of writing in the primary school. This has particular relevance to the present study which examines how promoting a metacognitive approach to writing with student teachers might influence their participation in teaching writing in the classroom.

Understanding and demonstrating metacognitive knowledge and regulation skills has been addressed only relatively recently in the literature and the research into relevant and appropriate measures of metacognition is a relatively new area. The final part of the literature review provides a context of data collection procedures for demonstrating understanding and knowledge about metacognition. It then reviews some of the attempts at measuring the associated concepts.





## Part 5      Data Collection Procedures

### Classification of approaches to data collection

In examining the specific literature on data collection procedures, two related areas were reviewed: empirical research into the cognitive processes involved in writing which does not target metacognition; and empirical research targeting the measurement of metacognition at general as well as specific levels. There is a significant degree of similarity in the data collection procedures across these two research areas, with both identifying two approaches in two contexts, as summarised in Table 2.4. It seems evident that each of the classifications given applies equally well to measures of cognition and of metacognition.

**Table 2.4**      Classification of data collection methods in cognitive writing research (after Janssen, van Waes and van den Bergh, 1996)

	<i>More direct approaches</i>	<i>Less direct approaches</i>
<i>Synchronous data collection</i>	Concurrent think aloud protocols	Observation of characteristics of the writing process
<i>Asynchronous data collection</i>	Retrospective think aloud protocols	Observation of characteristics of the writing product

## Think aloud protocols

Hayes and Flower (1980) define a protocol, for their purposes, as “a description of the activities, ordered in time, which a subject engages in while performing a task” (p 4). They argue that concurrent think-aloud protocols can be used to analyse a writer’s engagement in the writing task, particularly with those respondents who are clear in commenting about their writing processes. They further argue that using such protocols helps to identify the sub processes involved in writing and subsequently their organisation into a coherent and successful approach to writing. Hayes and Flower used this technique to collect the evidence on which they based their original model of writing.

A similar use was made of think-aloud protocols by Scardamalia and Bereiter (1987) to develop their model of writing based on knowledge telling and knowledge transformation. They administered the data collection procedures at the stage of planning for writing and they were able to demonstrate that the differences between knowledge telling by novice writers and knowledge transformation by expert writers lay not just in what they recounted but also in the relationship between what was spoken and what finally appeared in the written script. For the novice writers, the spoken planning comments matched very closely the content of the subsequent writing, whereas with the expert writers, the majority of the spoken comments were provisional ideas and statements that became expanded in the written text.

In a study of reading, retrospective thinking aloud was encouraged through the use of video recordings to stimulate the reader's recall (Juliebö, Malicky and Norman, 1998). Here, instances of metacognitive behaviour displayed by children in an intervention reading programme were identified as they occurred and video recorded by the researchers, the belief being that children may not be aware of the strategies they used. On being shown the video recording of their own behaviour, the children were then asked to say why they had behaved in the way they had and what they had been thinking at the time. Juliebö *et al* argued that the use of the video recording led to a



more accurate and a more complete set of comments from their sample about their thinking while reading, than would have been obtained without the aid of this recorded material.

Other work using think-aloud approaches has attempted to include teacher modelling where teachers would demonstrate to children how they would monitor their progress during writing by asking aloud questions about comprehension and communication (Englert and Raphael, 1988). This was followed by the introduction of a series of 'think sheets' which presented a set of prompts or questions to help focus on the writing's content, purpose or intended audience. In these studies, the teachers demonstrated how they would think aloud using the think sheets, and then the children were asked to do this while they were writing. Finally, the children were asked to verbalise their thinking in a classroom dialogue with the teacher and their peers.

A similar approach is reported by Ellis (1994) in the development of thinking as an executive strategy for writing, but in this report the focus is more on the development of a writing strategy than on assessing the cognitive process of writing or the measurement of metacognition in the context of writing.

The use of computer technology was included in an application of a concurrent think aloud protocol by Levy and Ransdell (1996) in a laboratory environment where they recorded the delays between the writer's key strokes when composing on a word processor. From this information, together with the writer's own comments, an attempt was made to analyse the writing composition process and the mental effort that the writers applied in each sub process of that task. Levy and Ransdell's findings led them to suggest that the relatively universal assumption that writers can do only one thing at a time (such as plan, generate, write, or revise) may be false and that modern technology should be used more extensively to explore recursiveness or multi-tasking in the cognitive aspects of involvement in a writing task.

## The reactivity argument

Think-aloud protocols, although widely used in cognitive writing research, have been questioned with regard to reliability and validity. The validity aspect of these approaches, in terms of properly representing the cognitive processes of writing, is questioned because of possible interference between the processes involved in talking and writing (Janssen, van Waes and van den Bergh, 1996; Stratman and Hamp-Lyons, 1994). This is referred to as the 'reactivity factor' in thinking aloud.

It seems likely that the reactivity factor will vary between individuals due to its dependence on individual differences, such as in commenting on the sub tasks involved in skills like reading and writing. Stratman and Hamp-Lyons suggested that there were at least five identifiable factors, each of which may have a contributing effect. This could be either positive or negative and the suggested five factors were:

- *directions* which may be ambiguous or otherwise and produce inappropriate oral responses;
- *constraints* due to limited short-term memory capacity for talking and thinking at the same time;
- *distraction* from hearing one's own voice;
- *learning* deriving from the attention given to ideas and thoughts by thinking out loud;
- *experimenter influence* through verbal or nonverbal cues.

Individual differences may also influence spoken comments and so influence the reliability of the contribution. What a person reports on one occasion may be different from what is reported on another occasion, for no overt reason other than the respondent's current preferences or feelings.

In examining the reactivity factor, Stratman and Hamp-Lyons (1994) surveyed studies of the influences on reporting cognitive processes of writing. They summarised arguments relating to how much of the information provided during think-aloud activities had to be recoded in an oral form from ideas held in the respondent's memory and therefore how much that recoding process would disrupt the ongoing cognitive processes associated with the task in hand. They also



examined the likely differences between writing about familiar and unfamiliar material and the effect of being an expert or novice learner. In their own studies, Stratman and Hamp-Lyons focussed on the possible differences between expert and novice writers and they found there were differences in the contribution which the learner's short-term memory played in producing an oral output for ongoing cognitive activities (that is, talking about what the writer was doing). Talking appeared to help the novice writer to create what were called *aural* images and these in turn helped to create a stronger impression in the writer's short-term memory. These suggested images, formed by the aural input, were held in short-term memory and subsequently helped the novice writer in the ongoing writing activity.

This auditory aspect of developing and supporting writing was also used for the derivation of the Hayes (1996) revised model of writing where a phonological memory is suggested as an essential part of the role of the working memory in influencing the cognitive processes of text creation.

Stratman and Hamp-Lyons concluded that thinking aloud might have only a slight effect on cognitive processes such as those involved in writing (and reading), and in particular that the effect was likely to be associated with the more complex aspects of a writing task. Stratman and Hamp-Lyons also argued there is not sufficient evidence to support the claims by Smagorinsky (1989, 1991) that studies of reactivity have been on highly selected samples and that, if much larger random populations were used, reactivity during writing and text revision activities would be randomised and unpredictable, because it is largely due to individual differences.

Janssen, van Waes and van den Bergh (1996) also surveyed the previous empirical research on the reactivity effect of thinking aloud but covered different studies from those in the Stratman and Hamp-Lyons investigation. They found the evidence for the reactivity effect to be inconclusive. In their own work, Janssen *et al.* carried out a close analysis of the influence of concurrent thinking and talking aloud on the writing process with a sample of students in Higher Education where the tasks included writing at the knowledge-telling level as well as at the knowledge-transforming

level. They found the effect of concurrent thinking aloud, although present in both conditions, was greater in the knowledge-transforming event. This was explained in terms of the knowledge-transforming task requiring the students to engage in more problem solving than did the knowledge-telling task and therefore the students were more aware of the cognitive activities which were demonstrably part of thinking. In the knowledge-telling task the thinking was more obviously at a level of vocalisations, that is, of translating ideas into words with very little relating to planning processes. The conclusion of this study was that the reactivity of thinking aloud varied with the nature of the writing task and, like the conclusion of Stratman and Hamp-Lyons, was more apparent in the more demanding scenarios. The implication was that for some writing tasks, extra efforts might have to be made to maintain an acceptable level of validity for thinking-aloud protocols by making sure that reactivity is absent or not present at levels which might have a disruptive effect.

From the summaries of Janssen, van Waes and van den Bergh (1996) and Stratman and Hamp-Lyons (1994) it appeared that the areas where reactivity of concurrent think-aloud protocols might relate particularly to the cognitive processes of writing could be as follows.

- The intellectual effort required to translate cognitive actions into an oral form.
- The amount of attention devoted to thinking or to speaking.
- Levels of development of short-term memory, if this is age related.
- The ease or difficulty of the task.
- The extent of bypassing some cognitive action by skilled learners as, if bypassed, cognitive actions may have become automatic and therefore not verbalised.
- Cognitive interference as it might influence completeness of writers' verbal reports.
- How verbalisation supports the thinking process.
- Different effects of verbalisation on cognition for novice and for mature learners.



Collecting data through an examination of text and of the writer in the process of producing a text offers an alternative to relying on comments from the writers and is seen as largely overcoming, or having the potential to overcome, the subjectivity of self-reporting or thinking aloud. It also overcomes any likelihood of a reactivity effect. Observation methods usually involve the creation of a set of objective criteria for analysing the writing produced, either as an end product or as a set of interim versions of a writer's composition. Of two recently reported techniques, one was developed by Allal (1993) where the researchers analysed the written work of 11 - 12 year olds as they moved from notes through a first draft of writing to a final presentation. In the Allal instrument the analysis of writing was structured around five dimensions, which were:

- *level of the language* affected by the transformation, such as words, word groups or sentences;
- *formatting* affected by the transformation, such as punctuation;
- *type of transformation*, such as addition, replacement or change of location;
- *object* of the transformation, such as the application of grammatical rules, organisation of discourse;
- *conventional/optional nature* of the transformation, whether the transformation is required by the application of conventional standards for writing or just optional at the discretion of the writer.

A different instrument was produced by Sanders and van Wijk (1996) who created a text analysis method called the 'Procedures for Incremental Structure Analysis'. The Sanders and van Wijk approach required the subdivision of a text into segments, followed by a decision (by the researcher not by the writer) on the hierarchical positions of each of the segments. These decisions are based on four aspects of each segment as follows.

- The *features* of each section which underlie its connection with the complete text;
- *Connections* with some of the other segments;
- The *hierarchical position* of these connections - such as subordinate or complementary;
- The *nature of the relationship* of these connections - such as sequence or elaboration.

Both the Allal study and the Sanders and van Wijk study claimed that their findings provided a significant amount of detailed information about the writing process. The claim of both sets of authors was that each approach, that is analysis of text transformations and the examination of the hierarchical structure of writing output, could be used in conjunction with other methods to make inferences about underlying metacognitive regulation of the writing process.

### **Interviews and self-reports**

Other forms of data collection used to assess progress through the writing process have included the use of structured interviews and self-reports. Their use is well established in examining many different aspects of cognitive activity (such as ordering, structuring, recollecting, hypothesising, etc.) because, as tools, they are relatively easy to administer to a wide range of learners across many different areas of learning in the classroom, the laboratory or the workplace. As measuring instruments, they can also normally be used relatively quickly and, by skilled markers, fairly easily. When interviews and self-reports are focused on aspects of metacognition rather than cognition, they become more complex both to establish and to analyse. The principal reason for this is that, whereas many respondents might have a reasonably clear understanding of features of cognition, the corresponding awareness of the features of metacognition could be much less unambiguous. That is, the level of learners' awareness of metacognitive processes involved in learning and therefore their ability to describe and report these accurately and truthfully, will probably be more variable in potential respondents. Tobias and Everson (1995) suggested that training in self-analysis of metacognitive processes would go some way to reducing the possible wide variations in self-reports but this would significantly extend the task of measuring the more complex constructs involved in metacognition.

Chan (1996) referred to work where structured interviews were used with gifted children and concluded that this approach could have favoured these children because of their superior linguistic skills. She therefore devised new measures of metacognitive abilities, also for use with gifted



children, and directed them at the knowledge and self-reported usage of learning strategies involved in information processing, planning and monitoring. These were self-assessment rating scales attempting to measure how children were engaged in different approaches to learning. The area investigated was reading. The results of the Chan study, however, did not provide conclusive evidence for a positive relationship between academic performance and the measured metacognitive abilities of knowledge and learning strategies.

### **Targeted measurement of metacognition**

Compared with measurement of the cognitive aspects of learning and problem solving, assessment of metacognitive skills has been a relatively recent research focus, but there are already claims that metacognitive assessment has proved to be more difficult and complex than the measurement of cognitive skills (Osborne, 2001; Tobias and Everson, 1995). This is despite the similarity in approaches for the assessment of the cognitive processes and for the measurement of metacognition. They both include the use of observation and reporting, where protocols of understanding cognitive and metacognitive activities are observed and recorded as they happen in both concurrent and retrospective environments. The difficulties lie in developing precision about the construct or constructs of metacognition and the consequent time-consuming nature of intensive questioning or observation required to reliably assess its presence.

Several reviews of measures of metacognition have been reported. One review by Thorpe and Satterly (1990) found that, in general, observations related to children's responses to individual learning tasks where the metacognitive component was identified more in the principles which learners used to reach a *specific* solution, than in a more *generalisable* learning outcome or type of solution. The principles observed were the metacognitive knowledge employed in the task solution and the skills of metacognitive self-regulation (monitoring and control) used by the learner during involvement in the task. In summarising the studies reviewed, Thorpe and Satterly highlighted four measures as being representative of assessment instruments covering the range of

metacognitive tasks given to children of primary school age. The aspects of metacognitive involvement which these four instruments covered were:

- *generating strategies*, where the measure required children to give as many strategies as they knew for solving memory problems, possibly indicating an element of metacognitive insight, (Kreutzer, Leonard and Flavell, 1975);
- *word list generation*, where the measure required demonstration of the principles of organisation, within memory related tasks (Tenney, 1975);
- *organisation of prose*, where the measure focused on knowledge and use of organisation of prose to aid later recall (Danner, 1976);
- *judging task difficulty*, where the measure related to judgements on the principle of 'chunking' for memory recall (Flavell and Wellman, 1977).

The approaches to collecting data identified in the Thorpe and Satterly review were the use of concurrent interviews and retrospective reporting. In the former approach, concurrent interviews, learners were asked to provide, during a problem-solving task, all the possible strategies which they might have used in finding a solution to the task, with 'diversity' (the number of strategies suggested) and 'metacognitive merit' (the most relevant strategies), indicating the level of metacognitive involvement. In the latter approach, retrospective reporting, the learners were asked to indicate the methods used rather than to list all possibilities known to them.

In all of the measures reviewed, Thorpe and Satterly concluded the metacognitive involvement was largely inferred through the researcher's judgement. They suggested that demonstration of a learner's metacognitive *awareness* was not necessarily an indication of metacognitive *effectiveness*. Further, after a detailed analysis of typical applications of these four examples, they concluded that although common features were discernible, there was not sufficient evidence for an underlying measurable concept of metacognition. Thorpe and Satterly suggested that an implication of this finding was to call into question the concept of metacognition, at least as a concept which could be experimentally measured. They suggested that metacognition is more likely to be a set of higher order skills, such as those of monitoring during learning.



Another, more recent, survey of measuring instruments for metacognitive functioning was reported by Osborne (2001). He concentrated on the specific aspects of reliability, validity and usability (by teachers rather than by researchers) of all the quantitative measures of metacognition that were identified from extensive literature searches. Qualitative measures were omitted because of limited psychometric or triangulation information on them and because they were deemed to be largely inappropriate for use by teachers.

Osborne examined four techniques which explicitly claimed to measure general metacognition and found them all lacking. Each claimed to have been designed to be applicable in more than a single context, and each was found to be lacking as follows.

- *Metacognitive Questionnaire* (Howard-Rose and Winne, 1993). This was deemed to have questionable reliability and validity.
- *Metacognition in Multiple Contexts Inventory* (Allen and Armour-Thomas, 1993). This was judged as having confusing items, low reliability and no validation.
- *Dynamic Assessment* (Clements and Nastasi, 1990). This did not appear to measure general metacognition and was seen as of marginal use for teachers.
- *Grade/performance prediction* (Vadhan and Stander, 1994). This did not appear to measure general metacognition, and lacked reliability and validity information.

The methods used in the measures of general metacognition in Osborne's (2001) review fell into three categories: retrospective self-reporting through the use of questionnaires; interviews; and the observation of learner behaviour. Osborne's conclusion was that these measures did not reliably indicate general metacognition and that consequently there was no such instrument known to be available. He suggested that it might not be desirable that such a measure should exist, even if it were feasible, in view of the complex nature of metacognition and of the movement towards studies that focussed on individual aspects of metacognition rather than general metacognition. He also surveyed measures of metamemory and of metacomprehension.

One instrument that Osborne's review found to be "versatile and impressive", and to be applicable across a range of ages, was produced by Tobias and Everson (1995) and referred to as the Metacognitive Knowledge Monitoring Assessment approach. It was seen as easy to administer and interpret, and applicable in many disciplines. Osborne claimed that this was a measure not of general metacognition, but of metacognitive comprehension monitoring.

Tobias and Everson's own description of their measure is that it is more objective than most others through being based on the discrepancy between learners' estimated and their actual knowledge in relation to learning (Tobias and Everson, 1995). The possible weakness of relying on learners' self reports might be the reliability of the data collected (about personal discrepancies). Tobias and Everson have argued, however, that because the reports were focused on knowledge, this would be more readily available to them than the recollection of the sub-tasks or cognitive processes which were given during reporting on thinking or problem solving activities. They gave evidence of the approach being successfully used in four contexts which were reported as follows.

- Assessing metacognition in mathematics with reference to anxiety in mathematics testing.
- Assessing metacognitive links with students' estimates of their ability to learn in a college environment.
- Assessing metacognition in relation to students' ability to successfully predict their learning in college before they had started on course.
- Assessing the links between metacognition and students' predictions about their performance on examinations related to college courses.

Tobias and Everson concluded from their investigations that their approach in examining estimated and actual knowledge was a valid measure for knowledge monitoring, as part of the construct of metacognition. They further suggested that assessing metacognition in this way has an added learning advantage in identifying, for the learner, the difference between what is known and what is not known. This awareness, they suggested, was a fundamental part of metacognition and as such must contribute to a learner's involvement in promoting or planning for further learning.



A useful distinction was drawn by Winne and Perry (2000) between the measurement of metacognitive knowledge and the measurement of metacognitive monitoring. As indicated above, Osborne (2001) claimed that Tobias and Everson’s studies, though claiming to target knowledge, used measures of comprehension monitoring. The work of Winne and Perry, being more specifically concerned with self-regulated learning, has examined specific aspects of this as they have appeared in different measurement instruments. They do not give precise details of the instruments used but they indicate that the approaches most commonly used for measuring the self-regulated learning aspects of metacognition have been questionnaires, structured interviews and teacher ratings. In their discrimination of the measurement of metacognitive knowledge from the measurement of metacognitive monitoring, they have listed the components of each which have been examined. This list is given in Table 2.5.

**Table 2.5**        Components of self-regulated learning which have been examined in studies of the measurement of metacognition (Winne and Perry, 2000)

<i>Metacognitive knowledge</i>
Knowledge of fine-grained cognitive operations that comprise cognitive tasks
Knowledge about strategies that articulate cognitive tactics
Procedural knowledge that enacts cognitive tactics
Conditional knowledge about occasions to enact cognitive tasks
Knowledge of tasks parameters (such as resources or standards for success)
Knowledge of self parameters (such as, interest and effort)
<i>Metacognitive monitoring</i>
Difficulty in addressing the task (ease of learning)
Match of achievement to standards (judgements of learning)
Probability of retrieval from long-term memory (feeling of knowing)
Confidence about the accuracy of monitoring

Winne and Perry (2000) proposed that in considering the measurement of self-regulation, research must operationally define a theory of self-regulation. In their attempts, therefore, to propose a protocol for measuring self-regulation, they suggested a structure for self-regulated learning which comprises two components, aptitudes and events. These two components derive from a description of metacognitive self-regulation which includes the changing of learning incrementally, a high value on personal progress in learning, and the effective use of metacognitive strategies.

In Winne and Perry's definition, aptitudes in the context of self-regulation are the personal attributes of learners which determine their future behaviour, such as, having procedural knowledge about cognitive strategies or knowing the variables of certain kinds of learning tasks which indicate the standards expected for their achievement. Attributes are relatively stable and can be applied at any stage in the completion of a learning task, although they may vary developmentally over longer periods of time. Aptitudes will also vary from one person to another and for one person, across different tasks.

The means of measuring aptitudes is commonly through the use of interviews or questionnaires and the measurement is likely to range over several instances of learners' descriptions of their activities which, when taken together, might indicate the approaches adopted in monitoring learning. The result of measuring self-regulation as an aptitude is to indicate learners' approaches or beliefs about initiating a self-regulatory strategy. For instance, learners might indicate that they use a reviewing strategy whatever the context, although the format of this strategy would be adjusted to suit the task conditions. An aptitude, therefore, can be predictive of future self-regulatory behaviour in new learning environments, provided, of course, that the writer is motivated to use it.

Events, which Winne and Perry suggested are the other component of self-regulated learning, are more like "states", each of which has a beginning and an end. They can involve cognitive operations to indicate that self-regulation is in operation (referred to as an "occurrence"). Further, events might involve repeated occurrences such as when moving from the initial state of monitoring difficulty in a learning task through to exercising metacognitive control. Such repeated occurrences have the form of "if – then" actions, possibly through the learner selecting, as part of the self-regulating event, particular tactics relevant for the learning task. Although Winne and Perry do not suggest it, this might be one aspect of self-regulation where an aptitude and an event co-exist and are mutually supportive. It seems likely that if an event involves self-regulatory abilities or aptitudes, then 'event' and 'aptitude' are going to be frequently connected.



Observation of, and therefore measurement of, self-regulation as an event is difficult because much of it is unseen. So, where an event of self-regulation involves comparison between a monitored state and the standard against which it is (usually cognitively) compared, the monitoring itself is not measured but is assumed to have taken place in order to produce the learner's response and this becomes the interpretation of the self-regulation measurement. For example, a student is reading an academic paper and finds great difficulty in following it. The decision about the difficulty marks the end stage of a self-regulatory event which has involved the student monitoring progress in reading the paper probably against more than a single standard (such as, length of time involved, number of hesitations to re-read, and self-monitoring of personal understanding). The *decision* about having great difficulty is the self-regulation indicator which follows from the monitoring actions. If the decision results in new action, Winne and Perry suggested, then this new action can be construed as an additional self-regulatory indicator.

The measurement procedures which Winne and Perry suggested were similar to the approaches used in measuring metacognition more generally, but to date they have not been widely used in the measurement of self-regulation. Winne and Perry recognised that the use of these approaches is still relatively new and that there are problems which still require to be addressed. They note, for example, that some attributes of self-regulation are more observable in the learning environment while others are less observable and that no single measure yet manages to address all attributes. In addition, there are the well-recognised difficulties of the accuracy of self-reports and of the selection by the respondent, from a range of possible responses, of information which is constructed to 'fit' the questions asked. Thirdly, they suggest, measures of self-regulated learning as an aptitude or as an event are difficult to link together so that a more comprehensive understanding of self-regulation practices might be achieved. These are listed separately for the measurement of self-regulated learning as an aptitude or as an event, as shown in Table 2.6.

**Table 2.6** Procedures for measuring self-regulated learning (Winne and Perry, 2000)

<i>Self-regulation as an aptitude:</i>	
Self-report questionnaires	These ask learners to respond to questions, which will generalise their actions across several events. They will cover areas such as motivation, methods of acquiring knowledge, use of support resources, etc.
Structured interviews	These produce verbal descriptions and can cover most areas of self-regulation such as monitoring actions and information relevant to the learning task.
Teacher judgements	These usually cover a range of events and can be used to make judgements about learners' overall approaches to self-regulation. Under certain conditions, they are usually highly reliable.

<i>Self-regulation as an event:</i>	
Think aloud measures	These may be structured or unstructured and are currently used particularly for the measurement of self-regulation in reading and writing.
Error detection tasks	These involve the artificial creation of errors in a learning task, requiring the learner to detect them. This detection and the subsequent learner's action are taken to indicate aspects of self-regulation.
Trace methodologies	These are actions taken by learners when engaged in a learning task which serve as external indicators of ongoing self-regulation and include activities such as highlighting or underlining texts or annotating within the body of a text or with marginal notes.
Observations of performance	These involve watching learners in action and making judgements about the relationships between contexts for learning and learner behaviours. They will usually be more successful if the observer knows the learning context well and is able to identify meaningful links between learners' action and what has led to the establishment of the context.

**Measurement of metacognition in writing**

A measure not mentioned in any of the reviews summarised above was reported in a study by Devine, Railey and Boshoff (1993). The thrust of the Devine *et al* study was to examine the links between students' metacognitive model of writing and their writing performance. The subjects involved were two different types of student on College language courses; those whose first language was English and those whose first language was other than English. Metacognitive awareness was assessed in part through an analysis of the students' model of writing by focussing on issues such as understanding the demands of the writing task, how to deal with concerns such as



grammar and communication, and the stages in writing from preparation to final drafting. The measuring instrument involved a combination of closed and open questions.

In an analysis of the students' responses, and looking for evidence of a metacognitive model of writing, Devine *et al* found that the responses centred around three distinct areas of concern or awareness: grammar and correctness; communication and a sense of awareness; and personal voice and self expression. From the information collected, the Devine *et al* study suggested that the students could be identified as having either a single-focused or a multi-dimensional metacognitive model of writing. This was interpreted as a model predominantly with one of the areas of awareness identified above, or two, or all three. Devine and his researchers were therefore able to show that learners, both those whose first language was English and other learners, might have different metacognitive models of writing and that these differences were in part responsible for a variation in students' writing performance. Even those students for whom the measurements indicated a multi-dimensional model of metacognition, there was frequently a more dominant focus on one of the three areas (grammar and correctness; communication and a sense of awareness; or personal voice and self expression). From the data gathered, Devine *et al* suggested that these different individual metacognitive models were linked with the differences in writing performance produced by the students.

Like the work of Winne and Perry (2000), a particular value of the Devine *et al* (1993) study was its support for promoting a metacognitive approach to the teaching of writing. There appeared to be some support for examining the links between the models of metacognition and the models of writing and, more generally, for a closer study of the links between metacognitive understanding and writing performance.

In conclusion, the opportunity to promote a better understanding of how the models of metacognition and models of writing might be linked or interrelated prompted the possibility of an experimental study which might make a contribution to both fields through an enhanced understanding of metacognition and the teaching of writing.





## Conclusions

This review of the literature has attempted to present some of the relevant literature and to indicate an appropriate background to the study reported in the chapters which follow. The two areas included in the review are metacognition and writing though neither area has been covered completely. The material presented in this review has been written with the intention of identifying some of the more obvious aspects (including concepts and models) of each area as they might support the proposition of links between them.

From parts 1 and 2, it was clear that the terminology relating to aspects of metacognition is not used uniformly. In this review, an attempt was made at identifying a usable matching of some of the more widely used descriptors of metacognitive knowledge and at identifying the key aspects for teaching and learning about metacognition. Many of these key aspects related to the development of metacognitive strategies and included: making explicit the relevant cognitive processes; reducing cognitive demand on working memory; transfer of control from the teacher to the learner; and the positive role of social interactions in enhancing metacognitive awareness. All of these were to be integrated into the teaching elements of this study

Regulation was presented in this review as a major component of metacognition, alongside metacognitive knowledge. Within part 3, therefore, a range of theoretical models produced a wide-ranging view of the prime components of this phenomenon. Most models indicated a process which often included stages, such as, of monitoring current behaviour, examination of metacognitive strategies and alteration of goal directed behaviours. Some more focussed models portrayed the social influence on regulation and the levels at which regulation might take place. These were integrated into the teaching elements of the present study but were also used in the design one of the new data collection instruments used in this study.

Relatively few aspects of metacognition and writing had been closely studied and none had addressed promoting a metacognitive approach to teaching writing in the classroom. The review of the literature therefore served less to suggest procedural possibilities than to identify some of the concepts and issues which were worthy of a more focussed study. From part 4, therefore, the two most widely quoted models of writing were used to inform and design the teaching in the present study. The Hayes (1996) model was employed as the core model for teaching about understanding the writing process and that of Scardamalia and Bereiter (1987) was introduced to promote an understanding of differences between expert and novice writers. To help achieve a more complete metacognitive model of writing, the recent work by McCutcheon (2000) was found to be particularly useful in elaborating the role of working memory in the writing process. These contributions from the literature made substantial contributions to both the teaching and data gathering activities of this study.

A pervasive aspect of this investigation has been to devise measuring instruments relating to metacognition in the area of writing. The literature confirmed that measuring metacognition was difficult, with a very limited number of reliable and valid measures which covered more than a few aspects of metacognitive activity. One key finding (Winne and Perry, 2000) was that adopting a focus on self-regulation helped to discriminate between metacognitive knowledge and metacognitive monitoring and this approach was instrumental in the selection of the thrust of much



of the efforts of the present study to collect relevant information about the adoption of a metacognitive approach to the teaching of writing.

The identification of a common thread (a metacognitive model of writing) linking all five parts of this literature review appeared to have been vindicated. The concept of a metacognitive model relates to several elements of the work reviewed and provides a basis for examining more fully the links between metacognition and the teaching of writing. A better understanding of these links has relevance at a *practical* level of how a writer identifies the key elements of metacognition (metacognitive knowledge and regulation) in the context of writing, such as might be associated with novice and expert writers. In addition, there is the need to enlarge *theoretical* understanding of selected models of metacognition and of writing separately, to be able to integrate them into a composite model of a metacognitive approach to teaching writing. Both the practical and the theoretical elements appeared to be worthy of study in the anticipation that each might be supportive of promoting a metacognitive approach for the teaching of writing to future learners. The identification and elaboration of a metacognitive model of writing is a significant element promoting this better understanding and has been instrumental in establishing an underlying theme for the study reported in this submission.





## Chapter 3

### Research questions, design and structure of the study

#### The research questions

The aspects of metacognition and writing addressed in this study are outlined in Chapter 1 and these, together with the key issues arising from the review of the literature in Chapter 2, helped to confirm that the general area for this study would be *“Metacognition and the teaching of writing – what are the links between these two areas and how might they be developed to help promote a metacognitive approach to teaching writing?”*

Three groups of people were seen as potential sources for evidence indicating the relationship between metacognition and the teaching of writing: teacher education students before they qualified as classroom teachers; qualified and experienced teachers in the classroom; and children in the classroom being taught writing. It was decided that an investigation focused on teacher education students might be readily implemented using University students currently on course and presently involved in learning about teaching writing in the primary school classroom. Carrying out an investigation with qualified and experienced teachers would have demanded substantially greater resources than were available and the willingness of a sufficient number of teachers to

participate in an instruction programme in metacognition. To implement an investigation with children in the classroom would have involved providing teaching for these children which might have not matched with their teachers' current practices and perceptions of teaching writing. It was therefore decided that the present study should concentrate on teacher education students before they qualified and at a stage in their development when they could be expected to be able and willing to learn about, and to be involved in, such ground-breaking developments.

There were also benefits from working with teacher education students. One clear advantage was that they were accessible and working with them experimentally required the co-operation of immediate colleagues. Working with the other potential groups would require the establishment of additional time (of school teachers and pupils) for instruction and data collection and this may not have been suitable to the Education Authorities. It was also helpful in working with students to explain to them that this study was relevant to their developing knowledge and understanding (in terms of "thinking about learning") as well as to their learning about a key curriculum area for teaching in the primary school (teaching writing – but this study would not specifically examine children's writing *per se*). It was appropriate to promote each of these with teacher education students because their course documentation claimed that their course was forward looking and relevant to the developing demands of the teaching profession. The notion of "keeping ahead" was therefore consistent with the ethos of their training. A possible disadvantage was that the students were not "volunteers" in that the teaching given to them was integrated into their course and the data collection that was asked of them was presented as an ongoing course activity. They did know, however, that the teaching and data collection were on a "trial" basis and would be considered for more permanent inclusion in the BEd course depending on the success of the trials.

Accordingly, the following five specific research questions were selected as relevant for teacher education students.

*Research question 1.* How can metacognitive thinking in relation to writing be measured before and after a period of teaching about metacognition? In view of the uncertainties reported in the literature about assessing metacognition in relation to writing, the purpose of this question was to



examine a newly developed set of questionnaire items as potentially relevant indicators in this area. The focus of these measures was specifically the metacognitive aspects of students' own writing and the students' awareness of the metacognitive features of teaching writing in the classroom.

*Research question 2.* To what extent does the 'metacognitive cycle' model proposed by Nelson and Narens (1990) indicate an appropriate approach for teaching the monitoring and control aspects of metacognition in relation to writing? There is widespread acceptance in the research literature that the Nelson and Narens model of metacognition is applicable to the exploration of monitoring and control more generally but there is no evidence of it having been used in the context of teaching writing. The acceptability of the model and the frequent reference made to it in the literature appeared to make it an appropriate model to use and this research question tested if it might be suitable in this new context.

*Research question 3.* Does the model of writing proposed by Hayes (1996) provide a suitable basis for examining writers' perceptions of the writing process? Of the two most widely reported models of writing which have led to extended research studies, that is, those of Bereiter and Scardamalia (1987) and Hayes (1996), it was decided that the Hayes model appeared to present features of the writing process which might be more readily identified by students relating to their perceptions of their own writing and to their perceptions of teaching writing in the classroom. This research question tested the rationale for that choice.

*Research question 4.* How does the promotion of a metacognitive approach to writing help students to develop their understanding of teaching writing in the primary school, particularly with regard to novice and expert models of writing and regulation in writing? The teaching of a metacognitive approach to writing in this study reflected key elements of the theories and models relevant to each area (metacognition and writing). Novice and expert models of writing and regulation were selected as prime examples of these key elements. This question aimed to indicate how much the students had been able to adopt a "thinking about writing" approach in developing their own understanding of writing but it did not directly assess their skill in teaching or their

intervention in pupil writing activities. The key elements selected were seen as relevant both to the theories and models presented and to what might be appropriate to the evidence which the students could collect in schools during the first two years of the BEd course.

*Research question 5.* How might certain models of metacognition and of writing be elaborated in terms of a single composite model? The function of this question was to examine a theoretical framework which might be used by students (and others) in their attempts at developing a metacognitive approach to writing. Because of the more theoretical nature of a possible composite model, this aspect was examined independently from the empirical data gathering activities with the student samples, but used the evidence from these findings in support of developing new proposals.

### **The research design**

The fundamental research design was an action research approach with a programme of teaching and associated data collection using whole “year group” classes of BEd students. Because there were two groups of subjects, experimental samples and a control sample, the design also had an element of the traditional experimental research approach, but the programme of activities used with the experimental samples was somewhat interventionist and evolutionary, rather than clearly prescribed and predetermined. For each type of sample the programme extended over a two-year period of two academic sessions. A summary is provided in Table 3.1. The action research programme comprised two major elements: a set of teaching sessions and several data collection sessions. The information collection targeted students’ metacognitive knowledge about writing in relation to themselves and to their pupils, and it focused on how students identified regulation in writing. The nature of the data collected was both quantitative and qualitative. The quantitative data indicated how the students demonstrated their metacognitive knowledge and their understanding of the regulation process in relation to writing. The qualitative data showed how the students were developing their knowledge and insight about the writing process.



**Table 3.1** Summary of stages for all samples with dates of implementation

	<i>Type of session</i>	<i>Summary of content</i>	<i>Instruments used in data collection</i>	<i>Experimental sample A</i>	<i>Control sample B</i>	<i>Experimental sample C</i>
Stage 1	Data collection	Baseline data, related to metacognitive knowledge	Multi-question instrument (open ended and item selection)	Oct 99	Oct 99	Oct 00
Stage 2	Teaching	Thinking about writing and the relationship with knowledge and regulation		Oct 99		Oct 00
Stage 3	Data collection	Comment on student course-related self-evaluation of writing task to focus on thinking about writing	Re-examination of language course-related student self-evaluation	Dec 99 – Jan 00		
Stage 4	Data collection	Reflection on thinking during writing, (metacognitive knowledge and self-regulation)	Self report ( <i>post hoc</i> ) on a writing task	Jan 00		Jan 01
Stage 5	Teaching	Model of writing and profile of a writer		Mar 00		Mar 01
Stage 6	Data collection	Student self-profiles as writers	Structured self-profile of a writer (new instrument)	Mar 00 – Apr 00		Mar 01 – Apr 01
Stage 7	Data collection	Independent assessment of student writing	Writing assessment using criteria-related and holistic indicators	Mar 00 – Apr 00		Mar 01 – Apr 01
Stage 8	Teaching	Model of metacognition and its functions in thinking about writing		May 00		Apr 01
Stage 9	Data collection	Single baseline item on metacognitive awareness	Item selection element of multi-question instrument at stage 1	May 00	May 00	May 01
Stage 10	Teaching	Thinking about teaching writing; links between models of writing and of metacognition		Oct 00		Oct 01
Stage 11	Data collection	Student derived profiles of children as writers	Structured writer profile of children	Nov 00 – Dec 00		Nov 01 – Dec 01
Stage 12	Teaching	Memory in writing; features of novice and expert writers		Dec 00		Dec 01
Stage 13	Teaching	Models of self-regulation in writing and its identification in practice		Mar 01		Mar 02
Stage 14	Data collection	Self regulation in writing in the classroom	Structured collection of classroom-related regulation practices	April 01 – May 01		April 02 – May 02
Stage 15	Teaching	Concluding integration of all input		June 01		June 02
Stage 16	Data collection	Re-measurement of baseline data	Multi-question instrument from stage 1	June 01	June 01	June 02

## **The data collection instruments**

The primary focus of most of the data collection instruments was to assess students' metacognitive awareness in the context of writing with an underlying belief of this study that metacognitive awareness included metacognitive knowledge and the metacognitive skills of regulation. Further, it was believed that metacognitive awareness of teaching writing was strongly related to, and could possibly be portrayed as, a metacognitive model of writing.

The instruments used at the earlier stages (stages 1, 3 and 4) focussed largely on metacognitive knowledge (both declarative and procedural), although some indications of students' awareness of metacognitive regulation (monitoring and control) were also identifiable in some of the earlier sub-questions. Some of this information was also collected at the midpoint stage (stage 9).

The use of the writer profile (stages 6 and 11) within the data collection instruments contributed to the developing image of the students' metacognitive model of writing (through both metacognitive knowledge and the potential for metacognitive regulation) and arose because of the students' own wishes to be able to assess themselves as writers within the context of a theoretical model of writing. Collecting writer profiles from two perspectives (the students' own and that of their pupils) consolidated the development of a metacognitive model of writing, because the models from the two perspectives were different and linked well with the descriptions in the literature of 'novice' and 'expert' writers. More detailed information of students' understanding of regulation was collected near the end of the study (stage 14) and was expected to help to enhance the students' understanding of this feature of their metacognitive models of writing. The final data collection was a re-application of the instruments used at the beginning, to gauge how the students' metacognitive knowledge had changed and how this might be reflected in their metacognitive models of writing.



## **The samples**

The samples used in the investigation were three whole year-groups of teacher education students during the first two years of their four-year teacher education course (BEd) on the Dundee Campus of Northern College (which combined with the University of Dundee before the completion of the study). They were

### *Experimental*

Sample A (initially the pilot sample, see below) - Dundee Campus Year One students starting the BEd course in October 1999.

Sample C - Dundee Campus Year One students starting the BEd course in October 2000.

### *Control*

Sample B - Dundee Campus Year Two students starting the BEd course in October 1998.

The constraints on selection of the samples were substantial and took account of the availability of time within the course timetable and the collaboration of other members of College staff in arrangements to allow access to the students for teaching and data collection purposes. These limitations meant that there was little flexibility in being able to select 'typical' teacher education students although was no reason to believe that any of the three groups of students were atypical in any way. Using two cohorts for the experimental sample may have gone some way in reducing any unusual effects from one year group and it would have been preferred if two cohorts could have been included in the control sample but this was logistically not possible.

At the start of the study, sample A students were considered to be a pilot sample throughout the first year of teaching and data collection. When sample C was included one full year after starting the pilot study, the work with the pilot sample was appraised and it was found that very little change was required in either the teaching or the data collection procedures. It was therefore decided that the pilot sample should become sample A and that it be considered alongside sample C to produce a larger experimental sample and a more comprehensive collection of the relevant data. In considering the choice of the control sample B, the Aberdeen Campus of Northern College Year

One cohort (commencing in October 1999) was considered, but course details indicated that there might be certain aspects of metacognition in writing included in the teaching on the Aberdeen campus. As an alternative, the Dundee Campus Year Two cohort was considered to have had no teaching about metacognition in the first year of their course and the students were still sufficiently close to the beginning of the four year course to permit them to be compared with their Year One colleagues in terms of their knowledge, understanding and skills relating to metacognition and the teaching of writing. This group was therefore selected as sample B. The use of a Year Two cohort of students for control sample B made it difficult to find a similar second control sample, as the corresponding cohort a year later was the first experimental sample. It was therefore decided to remain with a single year group for the control sample. There was no contact with the control sample apart from the three data collection stages (see Table 3.1).

Using whole year groups might have helped to reduce the potential of bias due to being unable to select samples from a wider population but this approach was subject loss by attrition across the period of the study. In this study the loss in numbers was

	Stage 1 (beginning)	Stage 16 (end)
Experimental Sample A	N = 54	N = 38
Control Sample B	N = 36	N = 23
Experimental Sample C	N = 76.	N = 39

Although only partially helpful, the population of teacher education students as a whole is a relatively selected group and therefore those members remaining in the samples at the end of the study might have been substantially typical of these students at the end of their second year of a four year BEd course. However, the reduction in the sample sizes by the end of the study does require some caution to be taken in over-generalising from the final conclusions of the study. The drop in numbers will have been partially due to students “dropping out” from their course and this is most likely to happen during the first year of the course (sample A and C in this study), but this accounted for a relatively small proportion of the change in numbers. A more substantial cause was likely to be a loss of motivation or difficulty with data collection tasks. This has created the



possibility that the students remaining in the three samples at the end of the study might have been more motivated and those who were coping better with the learning and assessment experiences.

### **Structure and content of the study**

There were two major elements in the study: teaching and data collection. The teaching sessions covered the following areas.

1. Why it was professionally important to be knowledgeable about thinking and learning. This specifically focused on the concept of “thinking about thinking and learning”.
2. How students might benefit from being aware of self-knowledge, task knowledge and skills knowledge as these contributed to their metacognitive awareness in the field of writing.
3. The meaning of monitoring and control, and how that was widely reported as a part of a metacognitive approach to learning and teaching. The context of this teaching related both to students’ personal writing and to teaching writing in the classroom. The framework in which the teaching was presented was the Nelson and Narens (1990) model of metacognition.
4. How monitoring and control were key features of the more general approach to regulation in learning and in particular to regulation as a part of successful and autonomous learning. This was taught specifically in the context of students’ own writing and how they might approach teaching writing in the classroom.
5. How some of the commonly reported theoretical models of writing could support and extend students’ understanding of the writing process. Most attention was given to the Hayes (1996) revised model of writing and its use was experimentally developed to include a prototype of a writer profile.
6. How the use of the terms “expert” and “novice”, introduced by Scardamalia and Bereiter (1987) to indicate that a single model of writing might not apply to *all* writers, could be helpful to promote students’ understanding of teaching writing from the early stages in the primary school to the later stages.

7. The importance of memory in learning and how this might function in relation to the demands on working memory, particularly in relation to the different learning demands of expert and novice writers.

The collection of data from this study was focused on determining how the participating students related the teaching about metacognition to their own involvement in the process of writing both as writers and as teachers of writing. The following evidence was collected from students.

1. Students' knowledge about personal writing.
2. Examples of the students' own writing which were assessed to produce a measure of the quality of their writing.
3. Their knowledge about the writing process, based on their reflection after completing a writing task.
4. Students' self-perception in the context of a profile of a writer and their observations on their pupils' writer profile, leading to the identification of some of the differences between novice and expert writers.
5. Evidence of regulation activities during the teaching of writing to children in the classroom.

### **Statistical analysis**

This study collected a large quantity of data, some of it more quantitative in nature and some more qualitative. The quantitative data were the more substantial of the two although the analysis presented in the following chapters has attempted to integrate, where appropriate, the qualitative data as illuminatory evidence in support of the findings.

Much of the data collected was to determine similarities and differences between the experimental groups and between the experimental groups taken together and the control group. The use of null hypothesis significance testing was therefore seen as seen as relevant to the



statistical analysis and for this reason the software package Statistical Package for the Social Sciences (SPSS) was obtained along with relevant Guides, Manuals and Tutorials. The design of the study was that the two samples (experimental and control) were *independent* and the use of tests of significant difference was therefore considered to be appropriate for the analysis of these data. As the data were usually nominal (through *post hoc* analysis of student comments), nonparametric statistical analysis was used rather than parametric statistical analysis, and it is reported (Kinnear and Gray, 2000) that the most suitable test for differences is the chi-square test for association.

The conditions for the use of parametric tests were closely examined and it was clear that for the majority of the statistical analysis these conditions were frequently not met. For example, although the samples were probably typical of the population of teacher education students, the data which they were asked to provide could not be defined as normally distributed. In addition, there was a complication in that the open-ended nature of many of questions led to responses in more than a single response category. Further, the data obtained from a large proportion of the data collection instruments were categorical and nominal in nature. It was therefore concluded that in these instances it was inappropriate to use parametric tests (Clark-Carter, 2004). Where it was deemed appropriate to use parametric tests (such as for correlation coefficients of measured scores) this analysis was undertaken.

A limitation of the chi-square test is that the probability its calculation reports, is for a non-directional hypothesis. All the possibilities presented within the data calculations are equally possible and therefore the interpretation of the findings must be treated with caution. This limitation meant that measures of statistically significant differences between samples (such as the experimental sample and the control sample) were considered more on the basis of the frequency of responses to a single category (or variable) than of a pattern of responses across several categories. A multivariate extension of chi-square test is reported in the literature but does not appear to widely used or available for computer-based analyses (Gerig, 1975). To support the chi-square analyses, the qualitative data has been used to elaborate and illuminate the results obtained from the

quantitative data. These qualitative analyses have therefore been used to indicate the trends and patterns of response, which subsequently have been interpreted to indicate possible explanations of the development of the students' metacognitive thinking. In many instances, however, it is recognised that there are frequently too few data to suggest more than likelihoods or possibilities, compared with better confirmed certainties.

With some of the data, where the analysis was less directed at differences between samples, it became more difficult to ascertain what form of analysis should take. For example, Wright (2003) suggests that alternatives to null hypothesis testing should be more routinely considered. However, the identification of appropriate statistical analysis was not found to be an easy process and the use of factor analysis was included, although its justification may not be statistically rigorous.

### **The organisational structure - stages of the study**

This is summarised in Figure 3.1.

#### *Stage 1 Data collection (October 1999; October 2000)*

This stage was used to establish the appropriateness of the experimental and control samples and to collect baseline data on metacognitive thinking from all samples. The experimental samples were subsequently involved with all the following teaching stages and all the data collection stages. The control sample was involved only with the midway stage and the final stage of data collection.

#### *Stage 2 Teaching (October 1999; October 2000)*

The teaching at this stage introduced ideas related to "thinking about learning" in general and to "thinking about writing" in particular. Without the use of the term "metacognition", its key features were presented, namely, knowledge and regulation (monitoring and control).

#### *Stage 3 Data collection (December 1999 - January 2000)*

Students in the experimental group completed a task as a part of their language course that involved making a personal evaluation of themselves as a writer under 6 prescribed headings. As a part of this study, comments were given on each student submission in terms of a metacognitive



understanding of the writing process. These were passed to individual students and to all members of the experimental sample. Due to circumstances outwith the control of this study, the same task was not given to the students in sample C and alternative arrangements could not be implemented.

*Stage 4 Data collection (January 2000; January 2001)*

All members of both experimental samples were asked to attempt a reflective task after completing a specified writing task which itself was part of their language course programme. The reflective task focused on students' knowledge about writing and their endeavours at monitoring and control.

*Stage 5 Teaching (March 2000; March 2001)*

A summary of the responses from stage 4 was returned to members of each experimental sample at beginning of this teaching session and were used to derive an outline model of writing based on Hayes (1996) model of writing. This model was elaborated to produce an individual profile of writing. Other theoretical models of writing were also presented.

*Stage 6 Data collection (March - April 2000; March - April 2001)*

Members of both experimental samples completed individual writing profiles based on the 5 categories derived at the preceding teaching session and based on Hayes (1996) model of writing.

*Stage 7 Data collection (March - April 2000; March - April 2001)*

All students in the two experimental samples had just completed an assessed writing task for the Language Studies department and the scripts were re-assessed using more detailed criteria for inclusion in the present study.

*Stage 8 Teaching (May 2000; April 2001)*

This teaching session introduced the term "metacognition" and emphasised its part in the personal knowledge and understanding of an individual's writing. The teaching session also focused on the extension of a metacognitive understanding of *personal* writing to a metacognitive understanding of *teaching* writing to children in the classroom.

*Stage 9 Data collection (May 2000; May 2001)*

This stage involved the completion of the single question from the baseline data collection instrument used at stage 1 which was expected to be the most reliable single measure of metacognitive awareness. All samples were involved in stage 9.

*Stage 10 Teaching (October 2000; October 2001)*

This teaching session was aimed at extending the concepts of metacognition in personal writing to metacognition in teaching children to write in the primary school classroom. This included reinforcing some of the previous teaching on metacognitive knowledge, regulation and theoretical models of writing. The role of short-term memory in writing was introduced and attention was drawn to the identifiable differences between novice and expert writers.

*Stage 11 Data collection (November - December 2000; November - December 2001)*

This stage required the students to observe in schools during a scheduled school placement, the instances or events which related to the five stages of the writer profile they had completed earlier on themselves. They were then asked to produce a profile of a writer as it might relate to their pupils, similar to the earlier task of completing a profile of themselves as a writer.

*Stage 12 Teaching (December 2000; December 2001)*

This session reinforced the earlier teaching about the Nelson and Narens (1990) model of metacognition and the Hayes (1996) model of writing. Using the data provided earlier by students, an elaboration was given of the average writer profile of all students. An introduction was also given to the functions of short-term memory and long-term memory in writing, and links were drawn with typical memory-related procedures of novice and expert writers.

*Stage 13 Teaching (March 2001; March 2002)*

This session attempted to make clearer the differences between novice and expert writers in terms of “knowledge telling” and “knowledge transforming”. A revision was given of the role of memory in teaching writing and the interaction between short-term memory (STM) and long-term memory (LTM). Regulation was introduced as a major strategy for improving writing and an elaboration was given of how it was an essential part of a metacognitive approach to writing.

*Stage 14 Data collection (April - May 2001; April - May 2002)*

Students were asked to identify actual or potential examples of regulation in practice, while on school placement. This was recorded under four headings of social, cognitive, physical and motivational regulation.



### *Stage 15 Teaching (June 2001; June 2002)*

The final teaching session was aimed at bringing together the work over the previous two years and at introducing the idea that a composite model of metacognition and writing might be possible.

### *Stage 16 Data collection (June 2001; June 2002)*

This was the final application of the original questionnaire on metacognition initially used at stage 1 and it was again given to all samples.

## **Presentation of results**

With many stages in this study, the collection of empirical data was spread across 9 sessions, interspersed with related teaching sessions. If the presentation of the results from all these sessions been given in a traditional Results section after the description of 16 sessions, two problems may have arisen. First, the logical sequence (and the content) of some teaching sessions was directly related to the results which were collected from an earlier data collection session and the description of the implementation of these sessions would be incomplete without the prior presentation of the relevant data. Second, the number and variety of the data collected were such that presentation of the data in a single result section would have been less easy to assimilate and comprehend than if they were presented consecutively with the description of the implementation of each session. Accordingly presentation of the results has been made as each of the stages has been described in the following chapters and the relevant discussion of these findings has been included at that point.

The concluding chapter, Conclusions and Implications, therefore goes beyond the discussion of the findings of the individual data collection sessions and presents a more global and reflective view of data from several sessions as they have been interpreted in providing some answers to the research questions.





## **Chapter 4**

### **Stage 1 Collection of baseline data**

#### **Function**

One function of stage 1, a data collection stage, was to establish a baseline of information about the samples involved in the investigation and the questions in the data collection instrument were therefore constructed in the context of writing. They were linked with a model of metacognition which included the two key features of metacognitive knowledge and regulation. Also, throughout this study there was a progression from focussing on students' own writing to focussing on students' contribution to teaching writing in the classroom and stage 1 included a question asking students to answer from both perspectives. All the measures used in stage 1 were re-administered in stage 16 at the end of the two year study and a single item was also given to all samples at the midpoint of the study (stage 9).

The second function of stage 1 was to assess the degree of similarity between the experimental samples and the control sample at the beginning of the study or to measure the differences between them, for comparison with data collected at the later stages.

## **Data analysis**

The questions asked in stage 1 were modelled on data collection procedures used in a study by Devine, Railey and Boshoff (1993) which attempted to explore a metacognitive model of writing as it was demonstrated by university students; a study with aims similar to the key aspects of the present study. After several trial versions, the final version of the data collection instruments was selected and had seven primary questions (see appendix 1). The normal completion time was 20 - 30 minutes.

### **Question 1. “Define good writing”**

### **Question 2. “What makes a good writer?”**

Questions 1 and 2 aimed to assess students’ basic knowledge of writing and it was expected that all the students would have had sufficient relevant past experience to be able to make sense of the terms “good writing” and “good writer” and thereby be able to recall or identify examples of these. It was recognised, however, that arguably good writing could be defined differently in different genres. The purpose of question 2 was to get the students to consider writing as it reflected the person rather than the task or its outcome, so that in answering, the students might show their own involvement in the writing process. Overall, it was expected that in their responses, students might indicate some evidence of metacognitive knowledge about writing, such as self-knowledge, task knowledge or strategy knowledge.

The data from questions 1 and 2 were considered together because the information provided by these two questions was largely complementary in providing a view of students’ metacognitive knowledge of writing. It was also found that the terminology used in the replies was substantially common. This similarity led to the derivation of a single protocol for analysing the findings from both questions, through grouping the responses into one of four categories (given in Table 4.2).



In the selection of these four categories, earlier attempts at identifying how individuals recognised their knowledge of the cognitive elements of writing (i.e. metacognitive knowledge) were examined. Devine, Railey and Boshoff (1993) suggested that responses to questions in a cognitive model-of-writing questionnaire clustered under three headings: *grammar and correctness*; *communication and awareness*; and *personal voice and self-expression*. An earlier suggestion (Bereiter, 1980), postulated five stages, ranging from the simplest level of intelligible written communication to the level at which writing had become an “integral part of thought”. The five stages in the Bereiter model were said to represent two “skill systems” of writing, one for producing ideas and another for transcribing them into written communication. In an expansion of the Bereiter model, Nicholls, Bauers, Pettitt, Redgwell, Seaman and Watson (1989) called these two systems a “performing aspect” and a “composing aspect” and suggested that Bereiter’s five stages reflected a differing balance between performing and composing, as the developing writer moved from the earlier to the later stages of a writing task. Nicholls *et al.* described “performing” as including legibility, sentence construction, spelling, grammar, punctuation, and paragraphing; and “composing” as including the selection of words and expressions, story structure, sequence, and planning. Thus “performing” approximated to the technical or instrumental elements of writing, while “composing” approximated to all other elements. The relationship between these suggestions is given in Table 4.1.

**Table 4.1** A summary of the key elements of writing

<i>Bereiter, (1980) -2 items)</i>	<i>Devine, Railey and Boshoff (1993) - 3 items</i>	<i>Nicholls, Bauers, Pettitt, Redgwell, Seaman &amp; Watson (1989)- 2 items</i>
producing ideas	personal voice and self-expression	composing: selection of words and expressions, story structure, sequence, and planning
transcribing them into written communication	grammar and correctness.	performing: legibility, sentence construction, spelling, grammar, punctuation, and paragraphing
	communication and awareness	

These three categorisations were examined closely using the data collected from questions 1 and 2. It was clear from the data collected in this study, that a ‘*Content*’ category was present, similar to ‘producing ideas’, in Table 4.1. It was also evident that there was a ‘*Presentation*’ category linked with ‘written communication’, ‘grammar and correctness’ and ‘spelling, grammar and

punctuation'. A third category appeared to be present covering the planning and the structure elements in Table 4.1, and this new category was called '*Process*'. Other data collected did not fit any of these three categories and were attributed to the category of '*The reader*', which appeared to be close to 'communication and awareness' in Table 4.1. Therefore a new structure for analysis, comprising four key aspects of writing (shown in Table 4.2) was adopted for examining the concepts of writing identified in responses to questions 1 and 2. This new structure was evaluated later in the study.

**Table 4.2.** Four key aspects of writing and their relationship with metacognitive knowledge

<i>Key aspects of writing</i>	<i>Examples of metacognitive knowledge</i>
1. <b>presentation</b> to include external, and practical features	All features relating to spelling, grammar, punctuation, neatness, legibility, paragraphing, presentation
2. <b>content</b> to include expression, writer's thoughts, and personal and internal features	All features relating to words & expressions, content, ideas, imagination, opinions, thoughts, emotions
3. <b>process</b> to include thinking, reflecting and planning features	All features relating to planning, drafting, monitoring, beginnings & endings, style
4. <b>the reader</b> to include communication, audience, and clarity features	All features relating to discussion, audience, conciseness, relevance, reader interest, sequence, flow

Using this categorisation, a summary of the responses to questions 1 and 2 is given in Table 4.3.

**Table 4.3.** Summary of responses to questions 1 and 2 at stage 1

<i>Question 1</i>	<i>N = 54</i>	<i>N = 36</i>	<i>N = 76</i>	<i>Chi-square</i>
<i>Response category</i>	<i>sample A</i>	<i>sample B</i>	<i>sample C</i>	
presentation	34	19	48	1.256 (p=0.534) NS
content	17	16	25	1.855 (p=0.396) NS
process	8	11	18	3.247 (p=0.197) NS
the reader	48	23	58	7.951 (p=0.019) *
<i>Question 2</i>	<i>N = 54</i>	<i>N = 36</i>	<i>N = 76</i>	
<i>Response category</i>	<i>sample A</i>	<i>sample B</i>	<i>sample C</i>	
presentation	7	10	9	5.138 (p=0.077) NS
content	28	19	54	6.140 (p=0.046) *
process	16	10	21	0.069 (p=0.966) NS
the reader	27	17	46	2.315 (p=0.314) NS

NS = not significant \* = significant at p<0.05 level



There was found to be no significant difference between the three samples for three of the four response categories in both question 1 and question 2. Where the significant difference was found, it was statistically significant at the 5% level; ‘the reader’ response category for question 1 and the ‘content’ category for question 2. In these instances the difference appeared to be largely due to sample A giving more than the expected responses for ‘the reader’ category in question 1 and sample C giving more than the expected responses for the ‘content’ categories in question two.

A qualitative examination of the responses given to question 1 indicated no reference to how good writing might be defined differently in relation to different genres. Answers were always of a non-genre specific nature. Typical examples were,

*“A piece of good writing will be able to interest the reader and also keep them interested.”*

*“Good writing has a beginning, middle and end which usually is quite logical in its sequence.”*

The four key aspects of writing identified in questions 1 and 2 were compared with the task and strategy knowledge categories of metacognitive knowledge suggested by Flavell, Miller & Miller (1993) and it was concluded that each aspect had a strong link with one or other of these two categories. Task knowledge was described Flavell *et al.* as relating to the information about a task and the intellectual demands which the task makes on the learner. With writing, this was interpreted as the ‘rules’ of writing such as those relating to punctuation, spelling and grammar, and the thoughts, ideas and emotions which the writer uses while completing the task. Flavell *et al.* described strategy knowledge as referring to knowing about how to achieve the intended outcome of a task and with regard to writing, this was taken as the use of such relevant writing processes as planning, choosing a writing style and drafting, as well as the key features of communication which might include flow, relevance for the reader and clarity of expression. Task knowledge therefore seemed to fit well with the presentation and content aspects of writing identified in questions 1 and 2, while strategy knowledge was seen as relating to the process and reader aspects of writing.

Using this categorisation of different types of metacognitive knowledge, the total number of responses relating to task knowledge (presentation plus content responses, totalling 286) was close

to the total number of responses relating to strategy knowledge (process plus the reader responses, totalling 303) across questions 1 and 2. These totals were distributed across the three samples as follows,

sample A - task knowledge 86 responses; strategy knowledge 99 responses

sample B - task knowledge 64 responses; strategy knowledge 61 responses

sample C - task knowledge 136 responses; strategy knowledge 143 responses.

These figures indicate that at the beginning of this study, all samples, experimental and control, exhibited roughly equal proportions of task knowledge and strategy knowledge in their responses to questions 1 and 2.

**Question 3. “What are the steps you would go through to produce a piece of academic writing (such as an assignment)?”**

Much of the information collected from the responses to questions 1 and 2 was declarative knowledge while that collected from the responses to question 3 was more indicative of procedural knowledge.

The responses given by the students in all samples were examined and found to fall into 8 categories, given in Table 4.4, where the data are ranked on the frequency of response under each heading. There was a high level of agreement across all three samples with the procedural steps appearing substantially consistently in each of the quartiles of the rank order for all samples. The relationship between the ranks was found to be strongly positive (using Spearman’s *rho*, see Table 4.4) when comparing each sample with each of the other two.

The data from question 3 gave an indication of the students’ strategy knowledge for all samples at the beginning of the study. One interpretation of the data might be that the highest ranking four steps are the more basic skills of text composition whereas the remaining four steps (lowest ranked)



might relate to a set of activities based on regulation of writing. This interpretation of the high and low ranking activities was re-examined when further data was collected later in the study.

**Table 4.4.** Rank order of responses to question 3 (with frequency in each category)

	<i>N</i> = 54	<i>N</i> = 36	<i>N</i> = 76
<i>Category of response</i>	<i>sample A</i>	<i>sample B</i>	<i>sample C</i>
Plan at the pre-writing stage	1= (28)	1 (30)	1 (49)
Write a draft	1= (28)	2= (22)	2 (43)
Create and follow a structure	3 (26)	4 (16)	4 (29)
Research and make notes	4 (25)	2= (22)	3 (42)
Identify thoughts and ideas	5 (22)	7 (8)	6= (10)
Edit, check spelling or proof read	6 (13)	5 (15)	5 (25)
Check understanding of the task	7= (3)	6 (11)	6= (10)
Put in quotes or references	7= (3)	8 (2)	8 (5)

First quartile (upper)		Third quartile	
Second quartile		Fourth quartile (lower)	

	<i>Spearman's rho</i>	<i>probability</i>
Between samples A and B	0.808	p = 0.000 **
Between samples B and C	0.930	p = 0.000 **
Between samples A and C	0.946	P = 0.000 **

\*\* = significant at p<0.01 level

A qualitative examination of the responses did not give any clearer explanation of the difference between the upper and lower halves of the responses because frequently the answers were given as lists of words or phrases. However, it was concluded that the experimental samples and the control sample were essentially similar in the aspects of strategy knowledge suggested by question 3.

#### **Question 4. "What would you do to improve a specific piece of your own writing?"**

This question was closely associated with monitoring and control of the writing process and was therefore expected to give an indication of the regulation aspect of students' metacognitive functioning in their own writing at the beginning of their course.



The initial analysis of the responses indicated nine separate categories of activity although the distribution of responses across these categories produced some very low numbers in a few instances. However, when this question was re-administered at stage 16 of this study, these nine categories were found to be insufficient and re-analysis of the data was undertaken, this time using twelve categories as the basis. These categories were used for both the stage 1 data and the stage 16 data and are given in Table 4.5 with some examples of the responses given by the students in the three samples at stage 1.

**Table 4.5** Twelve response categories for question 4, with examples, at stage 1

	<i>Response category</i>	<i>Example</i>
1	Read and learn about this style of writing	<i>"Assess other people's writing on the same topic" (sample A)</i> <i>"Read and learn about other ways in which you can achieve the same objective by another means" (sample C)</i>
2	Reflect or think about what has been written	<i>"Take time to reflect on it and decide how to write it better" (sample C)</i> <i>"Think about what sounds better in my own mind" (sample B)</i>
3	Take action to make improvement (unspecified)	<i>"Work on it to improve your weak points" (sample A)</i> <i>"Go back and work at aiming to meet any criticisms" (sample C)</i>
4	Read to find where to make improvements	<i>"Read it through again to see what improvements could be done" (sample C)</i> <i>"Read it through again highlighting parts that don't seem correct" (sample B)</i>
5	Check the grammar, spelling or punctuation	<i>"Check the spelling and grammar" (sample A)</i> <i>"If I spell words wrong, I look up the correct spelling" (sample C)</i>
6	Get advice from a tutor	<i>"Ask advice from a lecturer" (sample B)</i> <i>"Ask tutor for support" (sample A)</i>
7	Ask for help or another opinion (unspecified)	<i>"I would get a few opinions from other people" (sample C)</i> <i>"Ask someone else to read what I have written and ask them for constructive criticism" (sample B)</i>
8	Make changes to use better words or expressions	<i>"I would try to improve the language I had used" (sample C)</i> <i>"Change certain words to more appropriate words" (sample A)</i>
9	Make improvements to the content	<i>"Put more imagination and emotions/feelings into the writing" (sample B)</i> <i>"Try to change the order of the argument for importance, etc" (sample C)</i>
10	Ask for the opinion of a colleague	<i>"Ask a student colleague that you trust to read and give you feedback" (sample C)</i> <i>"Ask your classmates for advice" (sample B)</i>
11	Undertake some form of rewriting or redrafting	<i>"Rewrite the piece until you are satisfied" (sample A)</i> <i>"I would try writing the piece again bearing in mind the faults I found before" (sample C)</i>
12	Research the topic further (content information gathering)	<i>"I would personally do more research" (sample A)</i> <i>"You can research your topic you are writing about further" (sample C)</i>



Because of the large number of categories, quantitative analysis would have been based on some instances of small numbers. Therefore a structure for aggregating responses by combining categories was devised, through discriminating between responses which were more representative of a monitoring or of a control activity. The main criterion for the monitoring activities was the students' involvement in looking for, asking or generally collecting information about, improving writing. The main criterion for controlling activities was the students' involvement in some directed activity towards a change in their writing output.

The monitoring activities were subdivided into 'high-level monitoring' and 'low-level monitoring'. High-level monitoring involved activities where the students engaged metacognitively by making mental comparisons of their own writing with either an external standard (*"assess other people's writing on the same topic"*) or with the known goals for the writing task (*"take time to reflect and decide how to write it better"*). Low-level monitoring was where the students relied more on the mental activities of others (*"I would get a few opinions from other people"*) or by reference to established rules (*"check the spelling and grammar"*). Within the response categories used, it was not clear how to identify high level and low level control activities and so this category was left undifferentiated.

The combined categories were as follows (the numbers correspond with those in Table 4.5).

High level monitoring activities:

- Read and learn about this style of writing (1)
- Reflect or think about what has been written (2)
- Read to find where to make improvements (4)

Low level monitoring activities:

- Check the grammar, spelling or punctuation (5)
- Get advice from a tutor (6)
- Ask for help or another opinion (unspecified) (7)
- Ask for the opinion of a colleague (10)

Control activities:

- Take action to make improvement (unspecified) (3)
- Make changes to use better words or expressions (8)
- Make improvements to the content (9)
- Undertake some form of rewriting or redrafting (11)
- Research the topic further (content information gathering) (12)

Students frequently made responses in more than one category. A summary of the responses under these three headings is given in Table 4.6.

**Table 4.6** Responses in three major categories for question 4 at stage 1

	<i>N = 54</i>	<i>N = 36</i>	<i>N = 76</i>	<i>Chi-square</i>
<i>Response category</i>	<i>sample A</i>	<i>sample B</i>	<i>sample C</i>	
High level monitoring	38	24	52	0.142 (p=0.931) NS
Low level monitoring	39	25	63	3.276 (p=0.194) NS
Control	27	26	46	4.477 (p=0.107) NS

NS = non significant

Statistical analysis indicated no statistically significant difference between the three samples in their responses to question 4 in any of the three response categories. However a trend was discernible in that for experimental samples A and C there were more responses in each of the monitoring categories than in the control category. This was not found with control sample B. For each sample, however, there were more monitoring responses overall than responses for control. This was taken to indicate that all students gave greater prominence to the monitoring aspects of improving their own writing than to the control aspects. It might also have indicated that they had a clearer picture of what monitoring involved and a less clear idea of what control entailed.

**Question 5. “What do you think these terms mean in relation to writing? - *internal thoughts; genre; purpose; memory*”**

The responses from all three samples were generally similar, with only a few variations in the language used and only a small range of different answers (summarised in Table 4.7). Because of the more specific focus of this question the responses produced were categorised under a single heading for each term thus permitting the chi-square statistic to be calculated. Virtually all responses were given in the context of writing (as the question asked) and therefore all could be taken to reflect the students’ beliefs about these terms in relation to writing. However, and surprisingly, there were some nil responses for most of the four words, with all samples. Perhaps



these non-responses indicated that there were a few students who did have some difficulty in a writing-focussed definition of the words in this question.

**Table 4.7.** Summary of responses to question 5 at stage 1

	<i>N</i> = 54	<i>N</i> = 36	<i>N</i> = 76	
<i>Definitions given</i>	<i>sample A</i>	<i>sample B</i>	<i>sample C</i>	
Internal thoughts				
thoughts and ideas	38	28	55	Chi-square = 5.796 df = 6 p = 0.446 (NS)
feelings	9	5	11	
imagination	2	2	8	
no answer	5	1	2	
Genre				
type, style or form	37	30	54	Chi-square = 5.635 df = 4 p = 0.228 (NS)
subject or theme	8	5	8	
other/no answer	9	1	14	
Purpose				
why it is done	31	21	47	Chi-square = 2.647 df = 4 p = 0.619 (NS)
achieve an outcome	20	15	27	
other/no answer	3	0	2	
Memory				
bring in past experiences	19	9	26	Chi-square = 23.877 df = 6 p = 0.001**
remember after reading	14	10	41	
skills used in writing	3	4	3	
no answer	18	13	6	

NS = non significant \*\* = significant at  $p < 0.01$  level

The statistical analysis showed no significant difference between samples in their responses to three of the four terms, but a statistically significant difference in relation to their responses about the term ‘memory’. Examination of the data in Table 4.7 indicated two possible explanations. First, there was an unusually high number of responses from sample C relating memory to what was remembered *after* reading. There was no obvious reason for this apparent anomaly and it was re-examined at the application of the same questions to all three samples, at the end of the study. The second possible indicator of the significant difference was the higher proportion of no answers from sample A. This position was re-examined after the data were re-collected at the end of the study (stage 16).

**Question 6. “Assess yourself as a writer (use whatever descriptors you wish). My strengths.**

**My weaknesses”**

The reason for including a self-assessment question was to focus on selected aspects of students’ self-knowledge. In particular, students’ awareness of their own strengths and weaknesses is a part of their metacognitive self-knowledge and this aspect of writing might be expected to develop over the two years of this study.

The analysis of the responses to this question identified, firstly, that the words used by the students for each part of the answer, “strengths” or “weaknesses”, were essentially the same. This suggested that the students examined the same features of writing as they gave their responses. Secondly, it was found that there were five primary categories of response corresponding to the following descriptions.

*Preparation for writing* – planning, making notes, researching.

*Content of writing* – imagination; argument, ideas.

*The writing process* – structure; introduction and conclusion; drafting.

*Writing presentation skills* – punctuation; spelling; grammar; neatness.

*Communication with the reader* – informing, clarity; relevance.

Comparing these five primary categories with the four key aspects of writing used for questions 1 and 2 indicated a strong similarity, with all but the first of the five primary categories identical to the previous classification (presentation, content, process and the reader). The fifth category found with question 6 (preparation for writing) had probably been subsumed in the earlier four key aspects but at this stage, it seemed more appropriate to keep it separate.

As well the five primary categories, the responses to question 6 also produced three minor response categories according to the following descriptions.

*Personal traits related to writing* – where students identified such personal features as enjoyment of writing (and reading), experiencing ‘writer’s block’, and writing under pressure.



*Monitoring progress* – where students commented about reflecting on their writing.

*Specific kinds of writing* – where students nominated their strengths or weaknesses in such writing styles as creative writing and academic writing.

A summary of responses relating to the students' reported self-knowledge, together with the rank order of their frequency of appearance is given in Table 4.8. Statistical analysis (chi-square) of the frequencies of responses indicated no statistically significant differences between the three samples in any of their individually reported perceived strengths or weaknesses. In one instance a nil response did not permit this calculation to be implemented. The response categories falling into the first and fourth quartiles are indicated by the shading and confirm the similarity between the samples.

**Table 4.8** Summary of responses to question 6 with frequencies and rank order of categories

	<i>N</i> = 54		<i>N</i> = 36		<i>N</i> = 76		
<i>My Strengths</i>	<i>sample A</i>	<i>rank</i>	<i>sample B</i>	<i>rank</i>	<i>sample C</i>	<i>rank</i>	<i>Chi-square</i>
Preparation for writing	7	5	5	4	15	3	1.254 (p=0.534) NS
Content of writing	22	1	11	2=	36	1	2.865 (p=0.239) NS
The writing process	8	4	3	7	9	5	0.862 (p=0.650) NS
Writing presentation skills	21	2	16	1	27	2	0.824 (p=0.662) NS
Communication with the reader	6	6	11	2=	13	4	5.604 (p=0.061) NS
Personal traits related to writing	10	3	4	5=	8	6	1.937 (p=0.380) NS
Monitoring progress	5	7	2	8	3	8	1.591 (p=0.451) NS
Specific kinds of writing	1	8	4	5=	7	7	3.582 (p=0.167) NS
<i>My Weaknesses</i>	<i>sample A</i>	<i>rank</i>	<i>sample B</i>	<i>rank</i>	<i>sample C</i>	<i>rank</i>	
Preparation for writing	3	6	2	6	5	5	0.076 (p=0.963) NS
Content of writing	14	3	11	3	22	3	0.256 (p=0.880) NS
The writing process	9	4	7	4	10	4	0.397 (p=0.820) NS
Writing presentation skills	28	1	14	1	38	1	1.637 (p=0.441) NS
Communication with the reader	22	2	13	2	31	2	0.255 (p=0.880) NS
Personal traits related to writing	7	5	1	7=	3	6	5.248 (p=0.073) NS
Monitoring progress	2	7	1	7=	2	7=	0.133 (p=0.936) NS
Specific kinds of writing	0	-	6	5	2	7=	Not valid

First quartile (upper)

Fourth quartile (lower)

NS = non significant

A comparison was made with the responses to question 2 (students' views on what makes a good writer) and the highest ranking response categories to both questions are given in Table 4.9.



**Table 4.9**      Comparison of highest-ranking response categories for question 2 and question 6

<i>Response category</i>	<i>Question 2</i>			<i>Question 6- strengths</i>			<i>Question 6 - weaknesses</i>		
<i>sample</i>	A	B	C	A	B	C	A	B	C
Content of writing	1	1	1	1	2=	1	3	3	3
Communication with reader	2	2	2	6	2=	4	2	2	2
Writing presentation skills	4	3	4	2	1	2	1	1	1

This comparison indicated that the three highest ranking aspects of writing were common to responses from both questions indicating consistency between what the students thought was indicative of a good writer and what they saw as their own strengths. What might have been less expected was that they also saw these relevant features of good writers as their own weaknesses. Examination of the actual responses to questions 2 and 6 indicated a strong similarity in the ideas, if not the words used by individual students, such as *“has a wide range of knowledge”* (question 2, rated as content) and *“can think of many topics to write about”* (question 6, strength, rated as content of writing). It was clear from the data and from the expressions used in their responses, that the students saw the aspects of writing which were highly rated in questions 2 and 6 as important and to make such a recognition in the area of a personal weakness was seen as an important early indicator of metacognitive awareness in the teaching of writing. In addition, consistency between responses to the questions in the data collection instrument suggested that it was a reliable instrument.

**Question 7. “Select from the 12 items in the list below, the six which you feel at the moment, to be the most important for writing in the two contexts given at the top of each column**  
**GRAMMAR; WORDS & EXPRESSIONS; REFLECTING; SPELLING; DISCUSSION;**  
**DRAFTING; CONTENT; AUDIENCE; SEQUENCE; NEATNESS; PLANNING; IDEAS**  
**For me personally. For children I will be teaching”**

This question was based on one devised by Devine, Railey and Boshoff (1993) for their study involving the assessment of students’ cognitive model of writing. In the Devine *et al.* study, the



original question asked for two sets of responses to be made under the headings of '*Importance for you personally*' and '*Importance to teachers who grade your papers*'. Because the thrust of the present study related to students who would *teach* writing it was judged that a more appropriate focus for their responses would be '*Importance for me personally*' and '*Importance for children I will be teaching*'. The task was slightly altered from the original form, that is, from ranking all items in a list of 8, to selecting the 6 most important from a longer list of 12 items.

This was the only question which was not open-ended and was therefore more objective than those which preceded it, as the students were not required to suggest terms or explanations for their answers. Question 7 was also the single question which was used in stage 9 to gauge students' progress in the development of a metacognitive model, at the half way stage of the study. The summary of responses to both sections of this question is given in Table 4.10. There was a small number of students who did not select 6 items and their responses have been omitted from the following presentation and analysis.

**Table 4.10** Summary of responses for question 7 at stage 1

	<i>For me personally</i>				<i>For children I will be teaching</i>			
	<i>N = 52</i>	<i>N = 35</i>	<i>N = 75</i>		<i>N = 52</i>	<i>N = 35</i>	<i>N = 75</i>	
<i>Terms selected</i>	<i>sample A</i>	<i>sample B</i>	<i>sample C</i>	<i>Chi-square</i>	<i>sample A</i>	<i>sample B</i>	<i>sample C</i>	<i>Chi-square</i>
spelling	20	12	28	0.162 (p=0.922) NS	38	30	50	4.534 (p=0.104) NS
grammar	31	21	46	0.024 (p=0.988) NS	31	25	42	2.402 (p=0.301) NS
neatness	14	3	16	4.423 (p=0.110) NS	24	14	27	1.381 (p=0.517) NS
words/expressions	15	21	34	8.531 (p=0.014) *	45	22	62	8.027 (p=0.018) *
ideas	25	15	42	1.847 (p=0.397) NS	40	24	58	1.083 (p=0.579) NS
content	46	29	59	2.061 (p=0.357) NS	21	23	42	5.865 (p=0.053) NS
reflecting	32	23	42	1.025 (p=0.599) NS	13	6	29	5.887 (p=0.053) NS
drafting	35	20	39	2.969 (p=0.227) NS	6	5	7	0.607 (p=0.738) NS
planning	42	25	64	2.982 (p=0.225) NS	23	13	27	0.933 (p=0.627) NS
discussing	13	8	21	0.363 (p=0.834) NS	33	19	54	3.442 (p=0.179) NS
audience	22	22	29	5.875 (p=0.053) NS	7	13	14	7.528 (p=0.023) *
sequence	17	11	30	1.085 (p=0.581) NS	31	16	36	2.203 (p=0.332) NS

\* = significant at p<0.05 level NS = non significant

There were three items where a statistically significant difference between the samples was detected. One of these, 'words/expressions', was common to both scenarios with the other, 'audience', appearing only with respect to the pupils. This analysis did not reveal much about how



these selected items indicated the students’ metacognitive model of writing and therefore the data were also arranged in rank order of their appearance (experimental samples only) and the distribution of these ranks is shown in Table 4.11. A statistically significant difference between the two conditions was found and examination of the data in Table 4.11 showed that not a single term appeared in the same quartile for both conditions. This appeared to indicate that the students saw themselves as substantially different writers from their pupils. It was not clear at this stage what influenced the students’ judgements as they had very little experience of teaching writing in the classroom. These findings, therefore, might suggest certain assumptions, beliefs or a limited awareness among the students, concerning the differences between expert writers and novice writers. This was explored further at stages 11 and 14, later in this study.

**Table 4.11**      Number and ranking of responses to question 7 for combined experimental sample

<i>Terms selected</i>	<i>For me personally</i>		<i>For children I will be teaching</i>	
	<i>number</i>	<i>ranking</i>	<i>ranking</i>	<i>number</i>
spelling	48	9	3	88
grammar	77	3	5	72
neatness	30	12	8	51
words/expressions	49	8	1	107
ideas	67	6	2	98
content	105	1	7	62
reflecting	73	4=	10	41
drafting	73	4=	12	12
planning	106	2	9	50
discussing	34	11	4	87
audience	51	7	11	19
sequence	47	10	6	67

First quartile (upper)	
Second quartile	
Third quartile	
Fourth quartile (lower)	

Spearman’s rho = 24.646  
n = 306  
p = 0.010\*\* (two tailed)

\*\* = significant at p<.01 level

In an attempt to identify a structure to any relationship which might underlie the students’ choices of the terms used in question 7, a factor analysis of the data was carried out. The results of this analysis are given in Table 4.12.



**Table 4.12** Factors identified from factor analysis of responses to question 7

<i>For students themselves</i>			<i>For children they will teach.</i>		
<i>Factors</i>	<i>%age of variance</i>	<i>Terms with loadings of &gt;+0.5</i>		<i>%age of variance</i>	<i>Terms with loadings of &gt;+0.5</i>
Factor 1	13.313	audience reflecting drafting	Factor 1	13.475	spelling grammar
Factor 2	11.758	spelling grammar	Factor 2	12.732	planning
Factor 3	11.710	content planning	Factor 3	10.996	words/expressions
Factor 4	10.508	neatness	Factor 4	10.702	discussion ideas
Factor 5	9.817	words/expressions	Factor 5	10.165	audience

Extraction method: Principal Component Analysis

Rotation method: Varimax with Kaiser Normalisation

Two factors (spelling and grammar, and words/expressions) were found to be common to both conditions despite the rank order of the terms chosen being substantially different. The commonality may have been an indication of a relatively robust *cognitive* model of writing (that is, a good grasp of what it means to write from at least two perspectives) whereas the recorded differences in the rank order of chosen items for themselves and for children may be more indicative of a *metacognitive* understanding of the differences between novice and expert writers. These possibilities were re-examined when further data had been collected at stages 9 and 16.

### Assessment of writing

At the time of administering the stage 1 questionnaire, the students in the experimental sample C were asked to give an example of their writing by producing two or three paragraphs on “The Importance of Writing”. This was used as a baseline indicator of their writing ability at the start of the project and was compared with later assessments of their writing. The collection of this evidence was one of the small number of changes made after the first year of the study with samples A and B, for whom there are therefore no comparable data at stage 1.

Some recent views on the measurement of writing were taken into account in establishing a structure for the assessment of the students’ writing in this study. Huot (1990), for example,

identifies three *subjective* methods of assessment; primary trait, analytic and holistic. The primary trait approach is based on the nature of the task which would make specific demands on the writer to achieve a specified target. Such specific demands include the type or genre of writing, the expected outcome and awareness of the anticipated reader. Assessment according to the primary trait therefore involves the judge deciding how well the specified target had been achieved. The approach of analytic assessment depends on the identification of several properties associated with successful writing which might be expected to be present in writing samples. Such properties would include grammar, punctuation and spelling; communication, organisation and structure; and words, ideas and expressions. The analytic approach to assessment therefore requires the assessor to identify and possibly quantify the presence of each of these features. Holistic scoring relies on the marker's overall impression of the quality of the writing, possibly on a single global dimension but perhaps along two general dimensions, such as content and style. This approach was claimed to be the most popular and to have a reliability comparable to the other more intensive approaches (Huot, 1990; Kellogg, 1994).

*Objective* rather than subjective techniques in assessing writing adopt an analysis of the objective aspects of written texts. For example, text analysis computer programs can be used to examine features like spelling, punctuation, word repetition and grammar. Statistical analysis of text can produce word count, sentence length, simple and complex sentences, and readability indicators. Recent software also analyses texts for main ideas and linked concepts, thereby suggesting linear or branching development of ideas. All of these objective measures can be also compared against normative standards for different genres (Kellogg, 1994).

Comparison of writing can also be undertaken on the basis of textual cohesion or cohesive ties (Halliday and Hasan, 1976), that is, the links between sentences indicating how the development or progression of ideas is promoted across text, producing writing which flows and is easy to read and comprehend. This type of analysis has been extended by Sharples (1985) to distinguish between expert and novice writers, or mature and immature forms of writing, where the features which discriminate one from the other, appear at three levels. At the level of words and phrases, mature



writing contains abstract nouns and multiple modifiers, often absent from immature writing. At sentence level, ideas are inter-related with explanatory and descriptive phrases in mature writing, while they are more likely to be listed in immature writing. At the third level, chapters or whole texts, the differentiating features are the structural organisation of ideas, with mature writers presenting material using structured yet varied configurations of discourse, appropriate for the purpose. Immature writers will fail to use these levels of text management and will resort to a more arbitrary ordering and less clear development of ideas. The differences in these features of writing suggested by Sharples are very similar to the knowledge telling and knowledge transforming approaches used by expert and novice writers, as suggested by Bereiter and Scardamalia (1987).

The approach adopted for this study was substantially a subjective one (in the technical sense), and was carried out using two judges. One judge was a specialist in the teaching of writing (from the Northern College Department of Language Studies) and the other was the author of this report. Both the analytic and the holistic types of subjective assessment were used. The variables for the analytic element were

Organisation of the text:	correct style for the task text was cohesive sentences were correct
Vocabulary:	appropriate words were selected spelling was correct
Writing conventions:	grammar was correct punctuation was accurate

Each of the analytic variables was scored out of 3 with the highest score when the variable was judged to be present all of the time or to be at a generally good or acceptable standard. A score of 2 was given when the variable was present around 50% of the time or was generally satisfactory, with a score of 1 awarded when the variable was hardly present at all or was at a generally poor standard. The highest possible score was 21. In addition to the analytic assessment, a holistic grading was given on a scale of 1 to 5 with 5 being the best.

As a preliminary to assessing the writing examples for the present study, and to establish an acceptable level of *inter-rater* reliability (though this was not measured statistically), the judges undertook shared assessment of several unrelated pieces of students' writing. When the judges were satisfied they had achieved common standards of marking, both judges assessed each piece of writing for the *present* study using both forms of grading and they discussed their findings to produce an agreed score and an agreed grade for each student. The distribution of scores and grades are summarised in Table 4.13 and indicated a strong agreement between the two sets of agreed marks (Pearson correlation of 0.982). This is a measure of *inter-test* reliability and suggests that the two methods of assessing writing have produced highly similar students' grades.

**Table 4.13**      Distribution of writing grades for analytic and holistic assessment (sample C)

<i>Writing grade (holistic)</i>	<i>Number of students (holistic grade) N = 64</i>	<i>Number of students (analytic score) N = 64</i>	<i>Total score (analytic)</i>	<div>                     Pearson r = 0.982                      n = 5                      p =.003** (two tailed)                 </div>
5	2	2	19 - 21	
4	8	6	16 - 18	
3	19	17	13 - 15	
2	25	28	10 - 12	
1	10	11	7 - 9	

\*\* = significant at p<.01 level

A similar finding had had been reported earlier by Kellogg (1994) who suggested that holistic scoring has a reliability comparing favourably with other techniques and is justifiably the most economical approach. Therefore, only the holistic grading was used for the later comparisons of these results with other findings in this study.

### Discussion and conclusions from Stage 1

There were two main functions in the first stage of the study: to establish a base level of information about the samples against which to compare later findings; and to discover how close the samples might be for the purpose of comparing the experimental samples against a control



sample. In terms of a base level of information, the findings from stage 1 were interpreted in the context of the key metacognitive features of knowledge, and monitoring and control (regulation).

### *Knowledge*

A widely accepted way of looking at metacognitive knowledge is to examine how individuals take decisions on the basis of knowledge about themselves (self-knowledge), knowledge about the task (task-knowledge) and knowledge about strategies used in approaching a task (strategy-knowledge).

Some of the questions asked at stage 1 were an attempt to gauge what knowledge the sample students might have had and other questions were aimed at judging how they were able to take decisions or to make use of their knowledge. The two approaches, knowing and using knowledge, appeared to be related to the questions in stage 1 as shown in Table 4.14.

The extent which each of these questions might individually or collectively contribute to an assessment of metacognitive functioning was unclear at stage 1. This was examined further at the end of the study when all the questions at this stage were re-administered.

**Table 4.14** Analysis of type of knowledge assessed in each question at stage 1

	<i>Type of knowledge</i>	<i>Indication of knowledge or decisions based on knowledge</i>	<i>Comment</i>
Question 1	Task knowledge and strategy knowledge	Indication of knowledge	Both forms of knowledge appeared to be present in equal proportions.
Question 2	Task knowledge and strategy knowledge	Indication of knowledge	Both forms of knowledge appeared to be present in equal proportions.
Question 3	Strategy knowledge	Indication of knowledge	Possible indication of two elements of strategy knowledge covering writing production and monitoring.
Question 4	Strategy knowledge	Decisions based on knowledge	The data from this question also related to monitoring and control.
Question 5	Task knowledge	Indication of knowledge	Limited responses, but potentially interesting trends.
Question 6	Self knowledge	Indication of knowledge	Potentially a valid indication of self-knowledge.
Question 7	Task knowledge	Decisions based on knowledge	Objective nature of this question suggests strong links with a metacognitive model of writing which was different for students themselves and for their pupils.

### *Monitoring and control*

The focus of question 4 was specifically about monitoring and control, and all responses were expected to relate to students' understanding of, or engagement in, some aspect of regulating their own progress in a writing task.

The location of monitoring and control skills within a wider framework of metacognitive skills has been largely accepted (Brown, 1987; 1988) and it has been suggested that metacognitive knowledge plays a significant role in the application of strategies associated with monitoring and control. It has been argued, however, that regulation, if taken to embrace monitoring and control, does not influence all learners in the same way (Winne, 1995). Winne argues that metacognitive activities covering planning a learning activity, monitoring, and evaluating progress through a task, do not automatically lead the learner to being able to take appropriate controlling action to direct the learning process towards the most successful learning outcome. Not all monitoring leads necessarily to completely successful control. The data collected at stage 1 appeared to support that view.

The progressive integration between control and monitoring is described further by Boekaerts (1999), where she suggests that being able to regulate (monitor *and* control) should be considered from a perspective of internal or external regulation. Internal regulation is where students are able to specify their own goals and is evident in those who have sufficient metacognitive knowledge of the learning strategies associated with their learning task to be able to select the appropriate action for the relevant control-related activities. Other students, however, will require to be given (external) help, advice or suggestions from others to move towards the achievement of the expected learning outcome. Boekaerts also suggests that the different conditions of internal regulation and external regulation are linked to the learners' metacognitive skills; that is, with substantial external regulation, learners' metacognitive skills will develop poorly, whereas with minimal external regulation, metacognitive skills will already be fairly well developed and likely to become more efficient with increased practice. The conditions relating to the development of internal and



external regulation are influenced both by individual differences and the intellectual maturity of the learners. It is also likely to be true that many younger learners, as well as those lacking in experience of writing, will benefit from more external regulation in the early stages of the development of their writing skills.

The evidence collected from question 4 seemed to relate well to the distinction between the monitoring aspects of internal regulation and external regulation. For example, the division into high level monitoring and low level monitoring reflected how students were relatively independent or dependent learners. This coincided with the internal and external aspects of regulation suggested by Boekaerts. The students demonstrating high level monitoring (internal regulation) were operating at a higher metacognitive level than those showing low level monitoring (external regulation).

To some extent, question 3 also related to the potential for self-checking and some of the steps suggested were clearly in this domain. They were, however, given consistently less prominence than the other more task-related steps in the writing process. Question 6 also afforded students the opportunity to identify self-regulation strengths or weakness, but they appeared consistently at the lowest level (fourth quartile) in the students' favoured suggestions.

The conclusion was that there were early indications of metacognition evidenced by an involvement in monitoring and control, in some of the questions at the stage, but that this was not yet well developed.

### *Writing and teaching writing*

A further aspect of the information from stage 1 was the relationship between the students' metacognitive awareness of writing with regard to themselves as writers and with regard to teaching writing in the classroom. It was important to identify this relationship at the beginning of the study as the subsequent teaching attempted to shift the focus of metacognition in writing from students themselves as writers to students' involvement in teaching writing. The early links which

students had already made between these two were partially indicated by the differences between the responses to the two sections of question 7. However, the factor analysis of the data gathered from question 7 only partially supported this difference because there were two factors common to the two circumstances. Perhaps these findings were indicative of how students might be able to use a metacognitive knowledge of themselves as writers when promoting a metacognitive approach to children's writing in the classroom. A more comprehensive picture was expected when this question was re-administered at stage 9 and at stage 16.

### *Experimental and control samples*

With regard to the differences between the three samples, there were statistically significant differences in only a small number of areas. These were most likely due to the specific questions which related more to course teaching than to a metacognitive understanding of the writing process. The uncertain area of differences in question 3 remained unresolved and was to be examined later, at stage 16. Despite these differences it was concluded that there was sufficient similarity between the three groups, in terms of their understanding of metacognition, for either or both samples A and C to be used as an experimental group and sample B to be used as a control group.

### **Summary**

Stage 1 of the study was to establish baseline data for comparison with later observations and to check if the three samples initially chosen were sufficiently similar to serve as a control group and two experimental groups. The selection of two experimental groups followed from changing the first sample from a pilot sample to an experimental sample and helped to enlarge the evidence and the findings.

The establishment of the baseline data was essentially successful and the information collected was generally found to be relevant and potentially useful for comparison with subsequent data.



The data analysis indicated that students in all samples had both metacognitive task knowledge and strategy knowledge in relation to the context of writing, and had a limited awareness of monitoring and control. The first of these was interpreted as evidence for different forms of metacognitive knowledge and that declarative and procedural knowledge might be present in equal proportions. The second was interpreted as evidence of external and internal regulation but at a low level of priority and development. Taken together these were believed to be indicative of an early level of metacognitive understanding (indicating a metacognitive model) of writing, confirmed by some differences between the students' views of themselves as writers and their view of themselves as potential teachers of writing in the classroom.

The testing of the suitability of the samples as experimental and control samples was also successful, with a large degree of similarity being observed between the groups in the majority of the baseline data. On the few occasions when some differences between the groups were found, there were good explanations for such differences and they were deemed not to be sufficiently significant to prevent these groups from being used for the remainder of the study.





## **Chapter 5**

### **Stages 2, 3 and 4 Thinking about writing**

#### **Function**

Following the collection of the baseline data from all samples, stages 2, 3 and 4 involved only the experimental groups (but stage 3 was not undertaken with sample C because of unavoidable circumstances). All these stages focused on the metacognitive concepts of declarative knowledge, procedural knowledge and regulation. There was one teaching session with two data collection stages which gathered evidence of student awareness in these areas.

#### **STAGE 2**

In stage 2, the first teaching session of this study, an explanation was given of the experimental nature of the study, the students' part in it and the collaborative approach adopted, which involved staff from different College departments in the delivery of the course on teaching writing.

## Structure and content of the teaching

The teaching was structured around the following five elements.

1. *Teaching writing* – this related to the importance of teaching writing in the classroom and used evidence of the current concerns which parents, teachers and others felt about teaching writing at school. Relevant recent research was used indicate that classroom teachers felt unsupported and unmotivated in the teaching of writing (Cairney and Munro, 1999) and that there was a need to give teachers grounds for more confidence in the teaching of writing (Duffield and Munro, 1999).
2. *Personal learning* – this was a basic introduction to the promotion of personal learning through a better understanding of the learning process. The students were directed towards thinking about their own learning in writing with particular reference to promoting their own learning by interacting collaboratively with others. This was stressed because there was to be an emphasis on working together during subsequent parts of the Language Studies Department course on teaching writing, which would shortly be presented to these students.
3. *Reflecting* – this referred to the value of reflecting on personal performance as an aid to learning. The teaching included a demonstration to the students of being aware of the processes involved in their own learning and the regulation of these learning processes. The students were asked to remember these two elements of thinking about learning (knowing the processes, and regulation of their implementation) as they were important elements of the subsequent teaching sessions.
4. *Knowledge* – this related particularly to the importance of knowledge in thinking about learning. Each of the three forms of metacognitive knowledge was described: knowledge of the self as a learner; knowledge about the learning task; and knowledge about the skills and strategies which might be used. The focus was on the students' current knowledge about themselves as learners and some examples of different types of learner were provided. Examples of all three forms of knowledge in the field of writing were presented.



5. *Monitoring and control* – this introduced the concept of regulation, including monitoring and control. Two aspects were covered, the first in the context of the teaching and learning within a course (such as the BEd course) and the second in regulation (or self-regulation) for an individual learner. Suggestions were offered to show how regulation could be associated with an awareness of the goals of learning and of the scrutiny of a learner's progress towards these goals.

### STAGE 3

Stage 3 was a data collection stage and involved selected elements from an activity already in use by the Language Studies Department following lectures explaining the different phases of the writing process. These lectures had covered: the purpose of writing, preparation for writing planning for writing, the stages in writing, difficulties experienced in writing, and sharing drafts with colleagues as a means of revising writing. Also associated with these lectures were the writing and submission of an individually written piece of work of up to 500 words on why stories were important for children. This was formatively assessed by the Language Studies Department staff and feedback provided to the students to let them know how well they had completed it. The students were then required to respond to specific questions about how they had tackled the writing task and how they evaluated themselves as writers. The data collected from these questions were similar to some of the data collected at stage 1 of this investigation and they were therefore used as a reliability check on the data collection instrument used for stage 1. Two specific questions (from a larger set of six) were selected and they were as follows.

*What are the steps you would go through to produce a piece of academic writing?*

*What would you say are your strengths as a writer?*

These questions were virtually identical to question 3 and the part of question 6 referring to strengths, in stage 1 of the present study. Those questions were,

(3). *What are the steps you would go through to produce a piece of academic writing?*

(6). *Assess yourself as a writer. My strengths. My weaknesses.*

It was therefore decided that the stage 3 data should be taken from the responses the students had already given to the selected questions in the Language Studies Department activity. These responses were re-analysed and compared with the earlier data collected in the present study, and used to provide a reliability measure for the relevant elements of the stage 1 questionnaire.

### Data analysis

The time between the data collection at stage 1 and at stage 3 was about seven weeks and the following analysis was restricted to the data from those students who gave a response on both occasions. There were 38 students in this category.

### Question 1 “What steps you would go through to produce a piece of academic writing?”

The response categories identified in the stage 3 data were very similar to those found in stage 1 (question 3), with only a single new category of ‘sharing for proof reading’ appearing at the later stage. The responses were ranked in the order of the frequency of their appearance in these categories as shown in Table 5.1

**Table 5.1** Rank order of responses at stage 1 and 3 about steps to produce a piece of writing

<i>Category of response</i>	<i>Rank at stage 1</i>	<i>Rank at stage 3</i>
Create and follow a structure	1	5
Write a draft (or several drafts)	3=	1
Plan at the pre-writing stage	3=	2
Identify thoughts and ideas	3=	3=
Search for more material and make notes	5	3=
Edit, check spelling or proof read	6	7
Put in quotes or references	7	9
Check understanding of the task	8	6
Share for proof reading	-	8

Spearman’s rho = 0.638  
N = 8  
p = 0.089 (NS) (two tailed)

NS = non significant



This indicated a non significant relationship between the rank order of the two sets of data. A qualitative examination of two reports by the students, however, indicated that there was a noticeable similarity in the content of students’ comments although the frequency with which the students made these comment clearly differed between the two occasions. Some examples of was said at the two stages were:

<p>Student A at stage 1</p> <p><i>“Plan</i> <i>Research</i> <i>Answer questions</i> <i>First draft</i> <i>Feedback from peers/tutor</i> <i>More drafts</i> <i>Proof reading”</i></p>	<p>Student A at stage 3</p> <p><i>“Plan what you are going to do</i> <i>Research the topic</i> <i>Set out what goes in each section</i> <i>Write a rough draft</i> <i>Show it to your tutor and discuss it with your peers</i> <i>Write more drafts</i> <i>Proof read before you hand it in”</i></p>
<p>Student B at stage 1</p> <p><i>“I would make a plan of the assignment and give it an introduction, main body and a conclusion. I would note down the key points for each area. I would research it well and then start to write it.”</i></p>	<p>Student B at stage 3</p> <p><i>“I would compile a plan and note down how what I will put in the introduction. Then I would plan the main body of the text and note the key points I wanted to include. Finally I would put down some notes on the conclusion. I would make sure it was researched and then write a rough draft.”</i></p>

These responses themselves suggested that the students’ level of thinking about their own writing had not changed much in the short interval between the two data collection events although they had been more explanatory in their comments. The specialist staff in the Language Studies Department indicated that any more extensive change would not have been expected over this short period at the beginning of the course.

**Question 2 “What would you say are your strengths as a writer?”**

The categories of students’ responses were the same at both stages and the rank order of their appearance is given in Table 5.2. The analysis indicated a statistically significant relationship between the two sets of rank order positions. This was interpreted as indication that the students had changed little in their views about their strengths, although one item had shown a substantial shift in the frequency of responses given between the two stages, namely ‘preparation for writing’.

**Table 5.2** Rank order of responses at stage 1 and 3 about personal strengths as a writer

Category of response	Rank at stage 1	Rank at stage 3
Content of writing	1	1
Writing presentation skills	2	3=
Personal traits related to writing	3	2
The writing process	4	5
Communication with the reader	5	6=
Monitoring progress	6	6=
Preparation for writing	7	3=
Specific kinds of writing	8	8

Spearman's rho = 0.771  
N = 8  
p = 0.025 \* (two tailed)

\* = significant at p<.05 level

A possible explanation of the higher rank position for ‘preparation for writing’ at stage 3 compared with at stage 1 was that the students indicated an awareness of the need for planning and thinking as a part of preparation which had not been in evidence some weeks earlier. This was taken to be the result of teaching about preparation for writing in the writing course from the Language Studies Department immediately prior to the completion of the activity on which stage 3 was based. This was confirmed by a closer examination of responses as follows.

	Stage 1	Stage 3
Student C	<i>“Able to construct paragraphs, grammar, vocabulary”</i>	<i>“I am now able to plan quite well and I always try to gather any relevant information before I start writing”</i>
Student E	<i>“Spelling”</i>	<i>“Get every shred of information so that I can take on board all the points of view”</i>
Student F	<i>“A willingness to be corrected and a desire to improve”</i>	<i>“I am convinced of the need for thorough planning and try to work accordingly”</i>

Overall the picture presented was not clearly one of a strongly positive relationship between responses for the items used in the initial data collection instrument at stage 1 and their investigation a few months later.



## STAGE 4

Stage 4 was a data collection activity involving a short questionnaire structured around reflection on a writing task set by the Language Studies Department. Three aspects of the writing were addressed: awareness of the writing task; knowledge about the procedures for completing the writing task; and the ability to recount the activities undertaken in establishing the content of the writing for the task (see appendix 2). The expectation was that students might provide some indication of the metacognitive elements of their knowledge and of their attempts at monitoring and control of their own writing.

Question 1 was about students knowing what they had been asked to do. The focus of question 2 was on the decisions the students took in selecting an appropriate genre for completing the writing task and question 3 was about the content of their writing. Each of these questions had sub questions which created a problem not recognised until after the data collection had been completed with sample A. This related to the potentially ambiguous layout of the question paper, where many of the subsidiary questions to the main questions were printed together rather than separately, resulting in many respondents not answering every subsidiary question and frequently giving a composite answer covering more than one of them. This was rectified before the question paper was used with sample C which resulted in all the sub questions being answered. This is reflected in the following tables where the frequencies of responses given by sample A are given under the general headings of 'Question 1', 'Question 2', 'Question 3' with the frequencies of responses from sample C given under the headings of 'Question 1a', 'Question 1b', 'Question 1c', etc.

### Data analysis

The analysis of the responses to all questions used a single set of relevant category headings to cover all the responses given, irrespective of the question. Adopting this approach permitted



comparisons to be made more easily between the responses to all the questions although there was the disadvantage of interpreting a category ‘label’ to represent both declarative knowledge and procedural knowledge. There were 23 categories of response in total, though not all were involved with each question.

### Question 1 (*Knowledge of the task*)

(1a) “What did you do to try to understand the task?”

(1b) “What knowledge did you use?”

(1c) “How were you sure that you were correct in your understanding?”

The responses to question 1 are summarised in Table 5.3. Ten of the 23 response categories appeared in the responses across the two samples and some examples were;

Student G (sample C) Responses categorised under ‘Worked on it with peers’  
*“I discussed my thoughts with my group and listened to their ideas as well.”* (1a)  
*“I used knowledge from others in my group and from a number of books.”* (1b)  
*“I let my group and other friends read it over and then discuss it.”* (1c)

Student H (sample C) Responses categorised under ‘Checked understanding of the question’  
*“I read and re-read the task until I had a full understanding of what was required.”* (1a)  
*“I had interpreted the task correctly, my writing made sense and coincided with what was required.”* (1c)

**Table 5.3** Frequency of responses to stage 4 question 1

<i>Response category</i>	<i>sample A</i>	<i>sample C</i>		
	<i>Ques 1</i>	<i>Ques 1a</i>	<i>Ques 1b</i>	<i>Ques 1c</i>
Checked understanding of the question	13	34	3	5
Had a plan for writing		4		
Used own ideas	3	4	4	1
Thought about what to do		11		5
Worked on it with peers	28	14	7	28
Read extra material	8	7	13	3
Referred to course material	19	9	19	
Used own past experience	7		32	7
Consulted a course tutor	5	2	2	4
Was unsure or did not know				3

 Categories with highest number of responses



The five categories with most responses were the same for both samples indicating broad similarity between the two samples and enabling the subsequent analysis for question 1 to be carried out on the more fully detailed data from sample C. Analysis of these data was undertaken on the basis of the rank order of their response frequency as shown in Table 5.4.

**Table 5.4** Rank order of responses to stage 4 question 1a and question 1b

	<i>Question 1a</i>		<i>Question 1b</i>
1	checked understanding of the question	1	used own past experience
2	worked on it with peers	2	referred to course material
3	thought about what to do	3	read extra material
4	referred to course material	4	worked on it with peers
5	read extra material	5	used own ideas
6=	had a plan for writing	6	checked understanding of the question
	used own ideas		
8	consulted a course tutor	7	consulted a course tutor

Sub questions 1a and 1b were intended to gauge students' recollections of their *actions* or *procedural knowledge* (1a) and an awareness of their *declarative knowledge* (1b) of the writing task they had just completed, with a view to identifying evidence of a metacognitive approach to thinking about their own writing.

The responses to question 1a indicated, certainly for the most frequent categories of response, that relevant and appropriate procedures had been identified. In addition, these high-ranking responses were generally what might have been expected from mature writers. The high-ranked position of response 'worked on it with peers' was almost certainly the result of a strong focus on working in groups in the course on writing taught by the Language Studies Department as this was a strongly favoured approach to the writing tasks set by that Department. Some examples were:

*"I read the question, jotted down some ideas then re-read the question to see if my thoughts actually address the question."*

*"When trying to understand this task I read over it a number of times and discussed in my group what it was exactly I needed to do."*

The high-ranked responses to question 1b gave a clear indication of students' awareness of the writing task through knowledge from their previous experiences and from the writing course material. The following examples were typical of the students' knowledge.

*“Things that I had seen in schools (what children read) and personal experience (why I read as a child).”*

*“I used knowledge of my own and I used knowledge that I had just seen in the Primary classroom.”*

*“The knowledge that children find comfort and amusement from stories and the knowledge that the development of language and cognitive functions is enhanced and nurtured through the telling of stories.”*

These responses to questions 1a and 1b were clear examples of procedural and declarative knowledge suggesting that at least some students were aware of their knowledge about writing. This was interpreted as evidence of metacognitive approach to thinking about writing.

Question 1c was directed at the other major element of metacognitive function – regulation, and in particular at the elements of monitoring and control. The responses to this question are given in rank order listing in Table 5.5.

**Table 5.5** Rank order of responses to stage 4 question 1c

<i>Rank</i>	<i>Response category</i>
1	worked on it with peers
2	used own past experience
3=	checked understanding of the question
	thought about what to do
5	consulted a course tutor
6=	read extra material
	was unsure or did not know
8	used own ideas

The highest-ranking response, “worked on it with peers”, was very much in keeping with the course procedures that encouraged students to work in groups to plan a writing task. There was no way of assessing if these students would have adopted this form of monitoring in a less directed learning environment. It was therefore not possible to judge if this reflected a personally assimilated metacognitive approach or one based more on course expectations and so more of a surface approach. Of the lower ranking responses, “consulted with a course tutor” was, like the highest-ranked response, indicative of *external* regulation. Five of the remaining six responses (that is, excluding “was unsure or did not know”) suggested some degree of *internal* regulation, but with each of these, the responses were noticeably more vague than the responses indicating external regulation, as the following examples suggest.



External regulation,

*“Working with other students allows you to check that you are working along the right lines or at least aren’t the only one with the wrong idea.”*

*“I checked my thoughts against others and asked the lecturer if I was on the right track.”*

Internal regulation,

*“I looked at my notes from lectures”*

*“I backed up my writing with quotes”*

In summary, the evidence from question 1c supported that some students had adopted a metacognitive approach to regulating their writing behaviour while completing a writing task. This was more apparent in the evidence for external rather than internal regulation, and responses indicated a greater attention to monitoring than to control.

### **Question 2 (*The approach or genre adopted*)**

**(2a) “What did you do to decide on the most appropriate way to write (genre) for this task?”**

**(2b) “What knowledge did you use to make a decision?”**

**(2c) “How did you know that your decision was correct?”**

As with question 1, there was sufficient similarity between the responses from the two samples for the analysis to be carried out using only the more detailed data from sample C. Question 2a targeted students’ procedural knowledge and question 2b related to their declarative knowledge. The frequency of responses is given in Table 5.6, and their rank order in Table 5.7.

**Table 5.6** Frequency of responses to stage 4 question 2 for experimental samples

<i>Response category</i>	<i>sample A</i>	<i>sample C</i>		
	<i>Ques 2</i>	<i>Ques 2a</i>	<i>Ques 2b</i>	<i>Ques 2c</i>
Checked understanding of the question	5	4	2	5
Chose a style	12	28		
Used own past experience	18	3	29	7
Worked on it with peers	15	1	1	20
Referred to course material	8	5	10	
Consulted a course tutor	7		2	4
Used own ideas	3			2
Read extra material	6	6	7	
Thought about what to do		2	1	5
Was unsure or did not know				7

**Table 5.7** Rank order of responses to stage 4 question 2a and question 2b for sample C

<i>rank</i>	<i>Question 2a</i>	<i>rank</i>	<i>Question 2b</i>
1	chose a style for writing	1	used own past experience
2	read extra material	2	referred to course material
3	referred to course material	3	read extra material
4	checked understanding of the question	4=	checked understanding of the question
			consulted a course tutor
5	used own past experience	6	thought about what to do
6	thought about to do	7	worked on it with peers
7	worked on it with peers		

The most common response in Question 2a, by a substantial margin, referred to the selection of a writing style but these responses generally indicated *what* genre had been selected rather than *how* it had been selected. Most respondents selected a ‘formal’ or ‘academic style’ (16 students) indicating that the nature of the task, as an ‘academic exercise’ to be read by staff, determined that it had to be completed in a formal genre. No further elaboration or justification was usually given. Some chose a ‘personal style’ (7 students) to involve writing about their own experiences, or an ‘informative style’ (5 students), a term for which no extra details were provided. Overall, these responses indicated that the students may have had better declarative knowledge than procedural knowledge.

In the replies to question 2b, two response categories covered the majority of the comments and they indicated that the students had ‘used own past experience’ or that they had ‘referred to course material’. Both sets of responses were usually brief with little elaboration of what the knowledge might have been or how it related to the task in hand.

It appeared from the responses to questions 2a and 2b was that there was rather less evidence of either procedural knowledge or declarative knowledge. This was in contrast to the evidence from questions 1a and 1b where it appeared that there was appreciable evidence of a metacognitive approach to thinking about a writing task.

The sub question on monitoring, question 2c, produced seven different responses which were ranked as shown in Table 5.8. These items and the order of frequency of their occurrence were similar to the findings from question 1c. The highest frequency was again where students claimed



to be working with their peer group, supporting the conclusion from the earlier question that relatively external regulation was more apparent than relatively internal regulation.

**Table 5.8** Rank order of responses to stage 4 question 2c

<i>Rank</i>	<i>Response category</i>
1	worked on it with peers
2=	used own past experience
	was unsure or did not know
4=	checked understanding of the question
	thought about what to do
6	consulted a course tutor
7	used own ideas

There were other responses to question 2c which seemed to have little bearing on the question of how the students knew they had taken the correct decision about selecting a genre. This may have indicated that, at least for some students, there was a poor understanding of the process of monitoring and control.

From the data relating to question two, there seemed to be less evidence of a metacognitive influence on the students' thinking about writing. The difference with the responses to question 1, where there was a noticeable indication of a metacognitive influence, might be explained by the relative cognitive demand of the two questions. Question 1 was directed at what they thought the writing task was, whereas question two focussed on an understanding of the writing process and the selection of an appropriate approach. The difficulty of these two questions was probably different, with the first being easier than the second. The metacognitive contribution to the easier cognitive task appeared to be more apparent than the contribution to the more difficult task.

### **Question 3 (*Deriving the content*)**

**(3a) “What knowledge (of yourself, of the task and of possible strategies) did you use in deciding on the content of your writing?”**

**(3b) “How much did you use your own ideas and how much new ideas from others?”**

**(3c) “In what respects was your knowledge clarified by sharing and by reading?”**



(3d) “How did you decide what to include and what to reject?”

(3e) “What did you do to decide about your structure and sequence?”

(3f) “What did you do to monitor your progress, that is, to know if you were on the right track?”

The frequency of responses to question 3 is given in Table 5.9. The responses to question 3a related to both declarative and procedural knowledge and, although they were worded slightly differently for each sample, they were examined for both samples together. It was found that declarative knowledge was poorly represented in the replies, as the students made few attempts to indicate knowledge about themselves as writers. Knowledge about the task was also limited, although the comments about knowledge of strategies (procedural knowledge) were generally more relevant. Altogether, it was felt that the responses to question 3a had not shown significant evidence of metacognitive thinking.

**Table 5.9** Frequency of responses to stage 4 question 3 for experimental samples

<i>Response category</i>	<i>Q 3a</i>	<i>Q 3b/c</i>	<i>Q 3d/e</i>	<i>Q 3f</i>	<i>Q 3a</i>	<i>Q 3b</i>	<i>Q 3c</i>	<i>Q 3d</i>	<i>Q 3e</i>	<i>Q 3f</i>
Checked understanding of question				2	2	1	2	7	1	7
Read other material	15	7	7	1	11	7	3	3		2
Looked at relevance of material	3	4	15		3			20	4	
Ensured knowledge linked together			1		1		2	4	7	
Used own ideas	5	21			4	38		2		
Had a plan for writing	18		6	2	4			5	7	3
Used own past experience	1	1	1		24	1			2	
Used a structure for writing	7	1	10	1	3			1	14	1
Worked on it with peers	23	20	4	23	6	12	3			32
Referred to course material	11	1	3		11	2	2	1	3	1
Found understanding was extended	2	10					34	1		
Consulted a course tutor	1		2	6					2	1
Made sure context was right							1	3		
Did not have confidence in myself							3			
Looked at flow and sequence			2					2	5	1
Drafted and revised	4	2	2	2				1	2	6
Self-corrected or proof read										9
Was unsure or did not know				5						

Questions 3b and 3c were about students using their own ideas and developing them for inclusion in their writing. The range of different responses was noticeably small for these questions and a substantial number of students said they had used largely their own ideas for the



content of their writing. A significant number said they also used the ideas of others in their groups and from reading other material.

There was one category of response to question 3c which was interpreted as probably indicating metacognitive understanding of the writing task, that is, “found understanding was extended”. Three types of extension of ideas were suggested: clarification of ideas (28 responses), extension of ideas (12 responses) and organisation of ideas (4 responses). Although the category with the largest response (clarification) appeared substantially to be confirmation that their own ideas were appropriate, it seemed likely that in the other two categories of ‘extension of ideas’ and ‘organisation of ideas’ some form of transformation of ideas could have taken place. Such transformation of ideas into a different and possibly improved structure was similar to procedures suggested by Bereiter & Scardamalia (1987), where knowledge is transformed rather than merely transmitted during the course of transcribing it into written format. This activity is one indicator of ‘expert writers’ whose work is characterised by the transformation of ideas rather than their simple transmission. This principle of transformation is elaborated by McCutchen (2000) in the context of the generation of ideas which takes place in working memory during writing. McCutchen proposes that the limitations of working memory make the transformation of ideas very difficult for novice writers but much easier for expert writers. The evidence from questions 3b and 3c supported that at least a small number of students in the experimental samples demonstrated metacognitive awareness of writing and were at the level of expert writers. Some typical examples of their responses were as follows.

*“By reading I was able to put together and strengthen my own ideas. Reading helped me organise my knowledge.”*

*“My knowledge was clarified and expanded by reading and my general knowledge of the content required was clarified by sharing.”*

The responses to questions 3d and 3e were expected to reflect the students’ procedural knowledge about the organisation of the content of their writing for the completion of the writing task. The responses covered the two areas of inclusion (question 3d) and structuring (question 3e). The bulk of the comments about inclusion fell under the heading of “looked at the relevance of the material” and they were largely very general in nature although it was possible to identify sub-

categories of ‘importance’, ‘relevance’ or ‘personal preference’. There was little indication of searching for the reasons for making these decisions about inclusion and it seemed that the comments were largely at a superficial level. Typical examples were,

*“From my list of key points I decided which were most important and which seemed less important.”*

*“Reject these which I didn’t agree with or feel were important.”*

Of the responses relating to structuring the content (question 3e), the majority appeared under the heading of “used a structure for writing” where almost all replies suggested using an introduction, a main body and a conclusion (or a selection of these). Such comments did not indicate much *about* such an approach, but rather *that* it was used. Any indication of a deeper level of thinking about what was involved in the decision-making process about structuring was usually absent. Although all the statements were probably linked with procedural knowledge they lacked evidence of reflective thinking. It was concluded that the evidence for a metacognitive element of the students’ thinking was not substantially apparent in these responses. Typical examples were,

*“I followed the procedure I usually use (introduction, middle, conclusion).”*

*“I thought about which items could link easily with others.”*

The final sub-question of question 3 was about monitoring progress in establishing the content of the writing task. More than half of the responses fell into the single category of “worked on it with peers”, with a small number additionally consulting a course tutor. The nature of this collaboration or consultation for the purpose of monitoring was not extensively described but there was a mixed reaction to the value of the mutual support in the collaboration with peers. Some felt that such sharing was supportive and valuable while others felt it produced little actual change. However, many responses were non-committal. The fact that so many students responded about their use of peer collaboration, despite its variable value in monitoring, was probably more an indicator of the course expectations set by the Language Studies Department staff than the considered personal choice of the students. Typical responses were,

*“I shared my work with my friends and read some of theirs. I also asked some of my family to read my essay.”*



*“Spoke to other students. Did not get constructive feedback.”*

There were only a few students who reported being able to adopt some form of self-checking and their approaches were to look back at the question asked by the task, revise an earlier draft or proof-read for presentation errors such as grammar and spelling. Overall, the evidence of monitoring was similar to that gained from other sub-questions, that it was not very prominent and where it did occur it was largely through relatively external rather than relatively internal regulation.

#### **Discussion and conclusions from stages 2, 3 and 4**

The effect of the first teaching session of this study was difficult to assess at this point in the programme of teaching and data collection, but there was a feeling that the students were somewhat overwhelmed by the introduction of the topic of thinking about their writing, within only a few weeks of the start of their four-year course. Some of the concepts introduced, such as different types of knowledge and the idea of regulation to include monitoring and control, were demanding for some and possibly bewildering for others. It was therefore a crucial decision to judge when to introduce the subsequent data collection stages, as they were, to some extent, dependent on the students having made sense of the first teaching session. If the data were collected too soon, there was a higher risk that they would reflect merely surface learning. The decision was therefore to leave a gap of about 7 weeks and allow the Language Studies Department language course on writing to reach a stage where the students had submitted a formatively assessed writing task, before commencing on the next data collection stage of this study (that is, stage 3). In retrospect, this gap might have been too long for some students to remember much of the teaching given in stage 2 and one conclusion was that possibly the influence of the earlier teaching had not been carried forward to the subsequent stage 3 and stage 4 data collection.

Using the data collected at stage 3 to measure the reliability of two of the items from the stage 1 data collection did not produce as high a *test-retest* reliability as had been anticipated, although the closer examination of the actual responses was supportive of a degree of commonality in the students' reported perceptions. Possibly part of the explanation for the lower reliability than had been expected, lay with the use of the rank order correlation calculation (Spearman's rho).

Because the responses were categorical data and were not independent (that is, students frequently responded in several categories) it was not possible to use a more powerful parametric statistical analysis.

As an indication of *intra-rater* reliability, the categorisation of the responses given to the two questions used in stage 3 were judged on two occasions, a year apart, by the researcher. The Pearson correlation coefficients between the two sets of judgements were,

Question 1 (stage 3)  $r = 0.788$ ;  $n = 9$ ;  $p = 0.012^*$  (two tailed) \* = significant at  $p < .05$  level

Question 2 (stage 3)  $r = 0.848$ ;  $n = 8$ ;  $p = 0.008^{**}$  (two tailed) \*\* = significant at  $p < .01$  level

These indicated an acceptable or a high level of reliability of the coder judgement. The later coder judgements were used in the foregoing analysis.

Within stage 4, there were three recurring focuses in all the sub questions; i.e. procedural knowledge, declarative knowledge, and monitoring. *Procedural knowledge* was the focus of questions 1a, 2a, 3d and 3e. The qualitative analysis of the responses to each of these questions showed that it was only in question 1a that there appeared to be good indications of procedural knowledge. Most of the responses to the other questions were lacking in depth or elaboration. If the cause of this difference lay in the focus of the questions, it might have been that the question posed in 1a was *task*-directed, and as such was probably quite familiar to many students who would have experienced similar questions in earlier learning activities. The focus of questions 2a, 3d and 3e was more specifically directed at the *process* of writing. It might be a reasonable interpretation that the students' metacognitive model of thinking as reflected in their procedural knowledge, was identified at a general task-solving level in question 4, but was much less demonstrated in terms of thinking about writing.



The questions where the focus was more obviously *declarative knowledge* were questions 1b, 2b, 3a, 3b, and 3c. It was in question 1b where the strongest evidence of declarative knowledge was given and there were generally much poorer responses to the other questions. Overall, however, the attempt to express declarative knowledge was rather superficial. For example, the question about “what knowledge of yourself ..?” (question 3a) produced responses of recalled personal experiences, rather than knowledge *of* the students themselves. Even the better examples of declarative knowledge, given in response to question 1b, were substantially linked to personal past experiences. Overall, it was decided that there was a slightly higher level of declarative knowledge than procedural knowledge indicated within the responses to the questions in stage 4.

From the analysis of all the contributions from individual students (taking account of procedural as well as declarative knowledge) it was concluded that the most metacognitively oriented responses were given to question 1a.

The third focus of the stage 4 questions, i.e. *monitoring*, was examined in questions 1c, 2c and 3f. The responses to question 1c were more indicative of the evidence of a metacognitive awareness than the responses to questions 2c or 3f. The evidence for reflection was generally at a low level, however, and there was a minority of students who appeared to be aware that effective monitoring was associated with control or modifying actions.

The role of collaborating with peers for regulation or monitoring was unusually substantial. Students in their first term of a university course might be expected to be cautious of sharing work to be submitted for assessment with their colleagues. If students at this early stage in their course were uncertain of their own standards or progress, it would seem unlikely that they could expect their colleagues to be substantially better informed, particularly to the level of being able to offer evaluative comment. The fact that so much peer group collaboration was reported, was most likely due to the expectations of the writing course set by the Language Studies Department tutors, and it was a credit to them that such a large number of the students reported taking such action.

However, it was not completely clear from the students' responses if they fully understood the value of a balance between support from others (such as their peers) and the challenge of tackling writing on their own. Perhaps further training, time and effort on behalf of the students may have given them a greater understanding of the relative value of consultation and sharing. This area of alternative ways of supporting regulatory action in individual writing activities is one which would benefit from further research.

Vermunt (1998) examined the use of processing and regulation strategies in student learning and found that there were significant links between the regulation strategies employed by students and their engagement in co-operation with their fellow students during learning tasks. Vermunt found that there was a *decrease* in regulation of their learning as students showed an *increase* in their participation in co-operative learning. Vermunt also made a distinction between regulation which was internal and that which was external (through collaboration with others) and the finding was that externally regulated learning was associated with learning tasks which were seen as the intake of "provided knowledge". That situation might have been paralleled in the present study, if the students viewed what they had been taught in the Language Studies Department's writing course as essential knowledge for completing the subsequent writing tasks. Vermunt found in his students a strong relationship between their 'deep processing' learning styles and the degree of self-regulation of the learning process. Both of these involve learners in taking more responsibility for their learning. Accordingly, the converse, presumably, also is likely to be true, namely that learning which appears to be more superficial and places greater emphasis on the intake of unreconstructed knowledge, will be related to lower levels of regulation of the learning process. .

The findings from the present study could be interpreted as similarly linking the presence of regulation activities with the level of cognitive processing associated with addressing questions 1c and 2c. The greater cognitive demand of question 2c may not have led to the deeper learning strategies suggested by Vermunt. As a consequence, thinking about 'the most appropriate way to write', if approached using a surface learning strategy, appeared to have been associated with a lower involvement of regulation (relatively external rather than internal).



In conclusion, the evidence from the data collected suggested that metacognitive functioning was indicated by the self-report approach adopted at stage 4. In terms of metacognitive knowledge the evidence was that this was more apparent when the students were asked to reflect on what the task was, than on how to select a writing style or identify relevant content. This probably relates to a more surface thinking approach than a deep thinking approach. There were clear indications, however, from a small number of students, that clarification of their own ideas was part of their metacognitive approach to writing (as with expert writers). The responses to the questions at stage 4 also indicated that some students do have an understanding of the external influences on regulation in writing although they are more aware of monitoring actions than of control actions. A summary is given in Table 5.10.

**Table 5.10.** Summary of how items from stage 4 indicated different forms of metacognitive knowledge and regulation

<i>Response category</i>	<i>Possible indications of metacognitive knowledge</i>
Used own past experience	declarative knowledge (task related)
Referred to course material	declarative knowledge (task related)
Read extra material	declarative knowledge (task related)
Checked understanding of the question	procedural knowledge (task related)
Worked on it with peers	procedural knowledge (task related)
Looked at relevance of material	procedural knowledge (task related)
Found understanding was extended	declarative knowledge (person related)
Used own ideas	procedural knowledge (person related)
Used a structure for writing	procedural knowledge (strategy related)
	<i>Possible indications of regulation</i>
Worked on it with peers	External regulation but with mixed views about the value of sharing with the peer group

## Summary

Stages 2, 3 and 4 of the study contained the first teaching session with the experimental samples and this introduced the students to thinking about their own learning in general and writing in particular. The primary elements of the teaching were the value of reflecting on personal performance, the importance of knowledge in thinking about learning, and regulation of learning. The conclusion was that this first teaching session, given in the first few weeks of the BEd course, was probably difficult for many of the students.

There were two data collection sessions, the first being a part of an existing set of questions administered by the Language Studies Department to assist students in their on-going work towards completing a formatively assessed piece of writing. The questions selected for this study were used to provide a reliability measure for two of the stage 1 questions. The results suggested only a weak level of consistency.

The second data collection session followed the submission of the students' assessed writing to the Language Studies Department. This was a *post hoc* reflective summary of the procedures and knowledge which the students recollected having used during writing activity. The focus was on procedural knowledge, declarative knowledge and monitoring, as each might indicate the students' metacognitive functioning during a writing task. The findings suggested that there was some evidence of a metacognitive influence on student thinking and that it was more apparent when the reflection was directed at declarative knowledge about writing than when the reflection was focussed on writing procedures. Evidence in the students' responses of an awareness of monitoring and control was also found to be present, though not for all students. The conclusion was that the evidence indicated that both declarative and procedural knowledge were probably present in broadly similar proportions, supporting the knowledge aspects of a metacognitive model of writing for some students at this stage of the study.

Opportunities for further research were identified in examining how writers might use different forms of support (such as from peers, tutors or other sources) for regulatory action during writing.



## **Chapter 6**

### **Stages 5, 6 and 7 Profile of a writer**

#### **Function**

There was one teaching session and two data collection activities during stages 5, 6 and 7, all directed at developing and exploring the students' metacognitive understanding of writing. This was attempted through explaining a model of writing in the context of the students' knowledge and understanding of the writing process. The model of writing was extended to allow students to portray themselves as writers, using a set of descriptive categories (a profile of a writer). The teaching session was intended to support students in linking theory with practice, in the context of writing. These theory-practice links were further examined through comparing students' self-descriptions (in a writing activity), their writer profiles, and their assessed performance on a writing task.

## STAGE 5

Stage 5 was a teaching session, directed at introducing the students to a model of writing through the 'reality' of their own expressions and ideas produced when thinking about writing at stage 4.

### Structure and content of the teaching

The purpose of this teaching session was to use the students' responses to establish the main components of a model of writing. The responses from all the questions asked at stage 4 from the two experimental samples are categorised in Table 6.1, listed in order of their frequency of occurrence. The students in each sample were presented with their respective responses and all agreed that these 23 categories of response covered virtually everything that they had reported, following their involvement in the writing task.

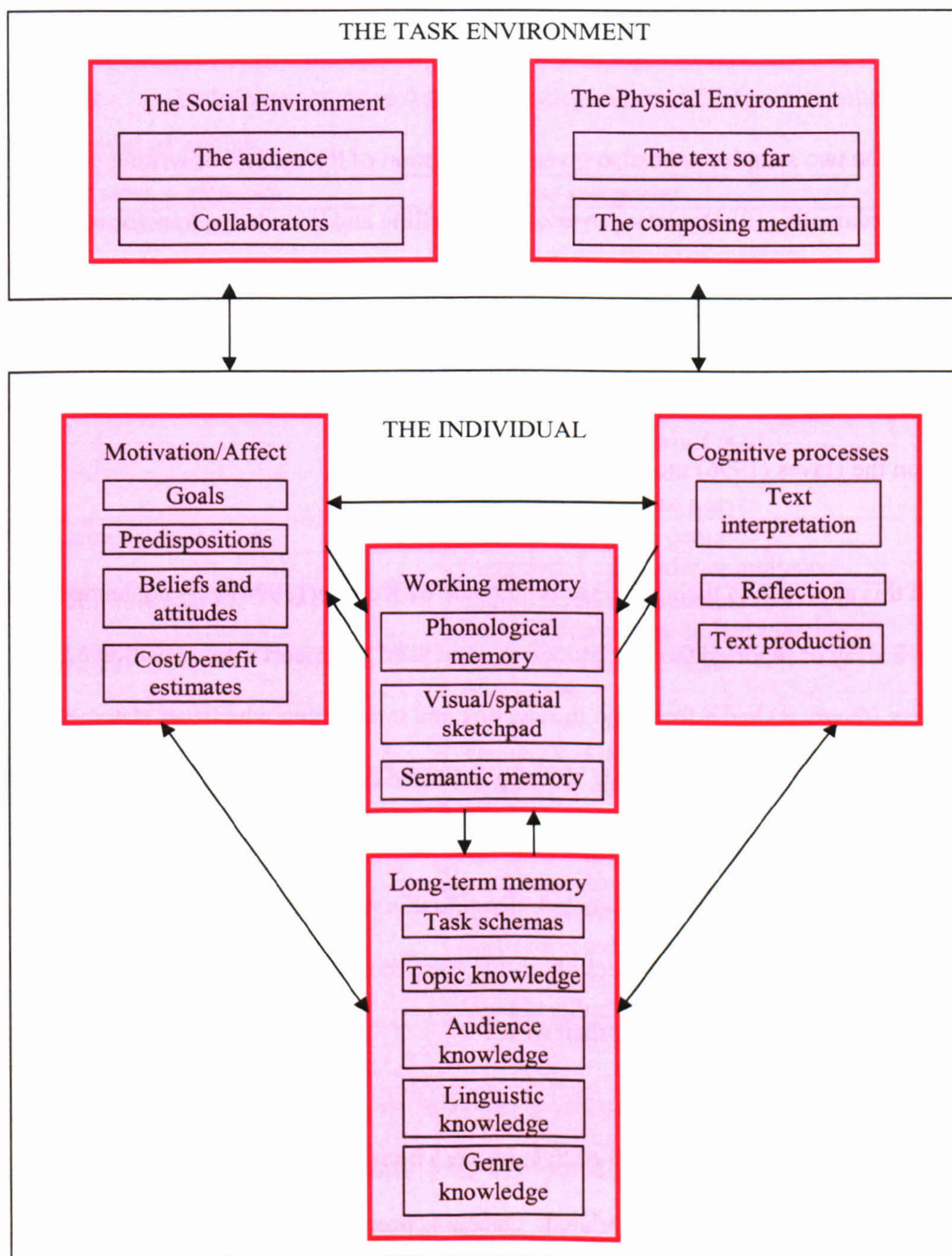
**Table 6.1** Categories of all responses given at stage 4 with frequency of occurrence

<i>Response</i>	<i>Total</i>
Worked on it with peers	237
Used own past experience	133
Read other material	106
Referred to course material	105
Checked understanding of the question	93
Used own ideas	87
Had a plan for writing	49
Looked at relevance of material	49
Found understanding was extended	47
Used structure for writing	38
Consulted a course tutor	38
Identified and chose a style	40
Thought about what to do	24
Drafted and revised	19
Ensured knowledge linked together	15
Was unsure or did not know	15
Looked at flow and sequence	10
Self-corrected or proof read	9
Made sure context was right	4
Did not have confidence in myself	3
Considered the reader or audience	3
Used headings	3
The work suited my style of writing	2



The students were then shown Hayes' (1996) model of writing which was a revision of the earlier Hayes and Flower (1980) model of writing and each of the six categories within this model were briefly examined and described (the six highlighted boxes in Figure 6.1).

**Figure 6.1** Hayes' revised model of writing (Hayes, 1996)



The Hayes model of writing was seen as particularly relevant for this activity as its derivation had initially been proposed (Hayes and Flower, 1980) from detailed records of students thinking



aloud during a writing task. This was similar, though not identical, to the procedure for collecting the data used in the present study. The main difference was that Hayes and Flower had used think-aloud approaches to collect their data whereas the students in the present study used *post hoc* reporting, but this was not seen as invalidating the comparison. Support for using the Hayes (1996) model of writing also came from Sitko (1998) who suggested that there was a close match between the elements of the (earlier) Hayes and Flower model and beliefs which underlie much of what is currently accepted in the teaching of writing.

The students in the two samples were also given a description of the models of writing proposed by Bereiter and Scardamalia (1987) relating to knowledge telling and knowledge transforming in the writing process. The students were informed that further teaching about these models would take place on a later occasion when a description would be given about the different forms of handling knowledge and information used by expert and novice writers. The major focus of stage 5 was therefore on the Hayes (1996) model of writing.

A criticism of this approach to theorising has been made by Kellogg (1994) who contended that when an extensive array of reported thought processes were used to support a new position or theory, interpreters (theorists) had a free hand in selecting and interpreting whichever statements they wished to support their theoretical point. Kellogg indicated that the original Hayes and Flower (1980) model of writing was a “prime example” of the theorists relying more on their own insights than on an evaluation of the data collected. Despite this view, it was felt that students’ interest and motivation for a theoretical model of writing were more likely to be established and maintained with data that they identified as ‘their own’.

With each element of the Hayes model, the students were invited to identify which of the 23 categories of their own responses might be related. Once this process of matching their own comments to the elements of the Hayes model had begun, there was an enthusiastic discussion and a lively interest in this activity from a substantial number of students. The suggestions they made (summarised in Table 6.2) were argued about and finally accepted by very nearly every student. It



was their view that some response category items must be placed in more than a single element of the theoretical framework.

Student success in examining the results of their own thinking and in reflecting on themselves as writers, within a theoretical framework, were seen as key elements in promoting metacognitive thinking. The teaching in stage 5 was therefore an important part of helping the students to think metacognitively about writing.

**Table 6.2** Links between stage 4 response categories and the five elements of the Hayes (1996) model of writing

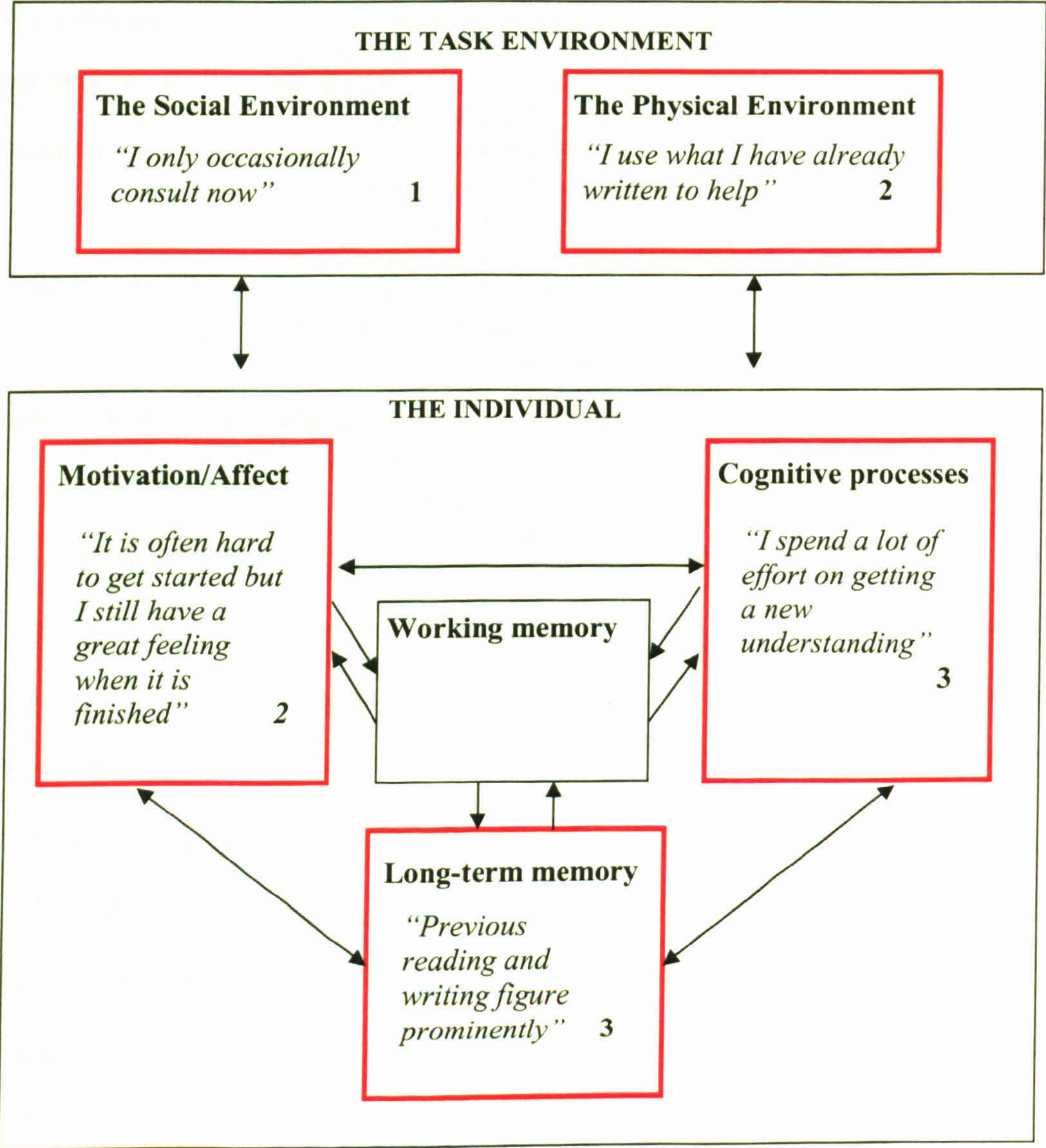
<i>Model of writing elements</i>	<i>Response categories</i>
Cognitive Processes	Used own ideas Looked at relevance of material Had a plan for writing Found understanding was extended Used structure to writing Reflected on what had to be done Ensured knowledge linked together Self-corrected or proof read Drafted and revised Identified and chose a style
The Social Environment	Worked on it with peers Considered the reader or audience
Long-Term Memory	Used own past experience Ensured knowledge linked together
Motivation/Affect	Consulted a course tutor Was unsure Did not have confidence in myself The work suited my style of writing
The Physical Environment	Referred to course material Read other material Checked understanding of the question Looked at flow and sequence Drafted and revised Self-corrected or proof read Made sure the context was right Used headings

The working memory category in the Hayes model proved difficult for the students to identify in the context of their own comments. This was probably partly to due to the relatively poor understanding which the students had of the concept of a working memory, particularly in terms of how it related to the process of writing. Due to this uncertainty, the working memory element was not included at this stage. This decision was reappraised at the end of the study.



As the students engaged in the activity of matching the response categories with the elements of the Hayes model of writing, they identified their own comments (from stage 4) and wanted to know how a model derived from one individual's self-reflective views might differ from a model derived by another. This gave rise to another enthusiastic discussion on how useful a model might be if it were truly a 'personal' model. There was a clear desire to 'personalise' the Hayes model by identifying in each of the five categories, the personal thoughts for an *individual* student and from this the students were shown how a personal profile of themselves as a writer might be usefully created. Several examples with individual students' suggestions for such 'personalised' models of writing were attempted during the teaching session and an example is shown in Figure 6.2.

**Figure 6.2** Sample profile of a writer (adapted from Hayes (1996) model of writing)





The use of completed writer profiles was then explored and it was agreed by the students that there would be considerable variation in the terms chosen by each individual who completed the profile. Such variation could be seen both as a strength and a weakness of the profile where the strength would come from users being able to genuinely reflect personal views about writing to create a unique writer profile and the weakness would be in the potentially wide variation of descriptors making it difficult to compare profiles. The students felt that a link between a writer profile and writing performance would be a useful one to make and they wanted to know what might be present or missing in their own profile as a contributing factor to their own writing performance. This led to the idea of giving each of the five elements in the writer profile a 'value', as one possible approach to making writer profiles more easily compared. Despite being subject to great variation in terms of individual judgements, a simple 'score' of 1, 2 or 3 was agreed. The score was to be decided by the individual writer, once for each of the five headings in the Hayes model, irrespective of how many comments were generated for any single heading, as shown in the example in Figure 6.2.

The basis for selecting a particular score was agreed as follows.

- A value of 3 corresponded to a category which was particularly relevant, appropriate or important for the respondent.
- A value of 2 corresponded to a category which was moderately important, relevant or appropriate for the respondent.
- A value of 1 indicated that the category was not very important, relevant or appropriate to the respondent.

It was agreed that a higher value need not represent a 'better' score and that scores might change over time for any individual respondent. The students accepted the use of the numerical values as helpful in comparing individual profiles and for identifying profiles which might be linked with different performances in writing. They saw this as a possible way of helping themselves develop as writers. The students were asked to complete an individual self-profile of a

writer and this was formalised into the data collection of stage 6 in the study. The possibilities for the use of the writer profile in the classroom were mentioned but were elaborated later at stage 11.

## STAGE 6

This was a data collection stage concerned with the creation of a 'Profile of a writer'. The purpose of completing the profile was to encourage students to relate their own perspectives on writing to the Hayes (1996) model of writing, to reinforce the practical value of a theoretical approach to understanding the writing process and to highlight a metacognitive approach to thinking about their own writing.

To assist in the completion of the writer profile an explanation was given of each of the five elements to be included (see appendix 3). This explanation summarised the five elements of the writer profile as follows.

*The Social Environment* - all aspects of the influences of other people on what, when, how and why an individual would write. This included: sharing with, and listening to, others; collaborating or writing for others; as well as recognising the influences others may have on a personal writing approach. Awareness of, and particularly taking account of, the intended reader would also feature.

*Motivation/Affect* - all the influences on how an individual might feel about writing; the apprehensions as well as the excitements and pleasures. It also included the difficulties which there might be in getting started or how enthusiasm might change before a piece of writing is finished, as well as the beliefs and attitudes which might influence what is written.

*The Physical Environment* - all the parts of an individual's physical environment which might affect the writing such as; surroundings, noise, facilities available, and interruptions from others. It also included the material already written for a particular task and how that might influence what will be written next.



*Long-Term Memory* - all that the individual has available from personal past experience and how it might be used. This covered both content knowledge and the procedural knowledge for each writing task. It also included indications of how easy it was to access personal memories and how past knowledge was structured during recall. Knowledge about the rules of writing, grammar, punctuation and spelling as well as knowledge about the requirements for writing in different genres, were also part of long-term memory.

*Cognitive Processes* - all the thinking which influences an individual's writing, such as: planning, sorting and re-organising content material; thinking about and taking decisions; trying to work things out; coping with challenges; clarifying personal understanding; and making changes. Reflection was included and covered the ability to consider different and appropriate perspectives in writing and how to present an argument or communicate effectively.

Students completed the profile by writing statements about themselves as writers under each of these five headings and then giving an overall 'value' of 1, 2 or 3 which they felt was representative of themselves for each of the categories, as described above. Students were allowed to compile this profile in their own time and were encouraged to include some reflection during its completion. In practice, the students took an unexpectedly long time to complete this task and subsequent discussion with individual members of each group indicated that many of them found it difficult.

## **Data analysis**

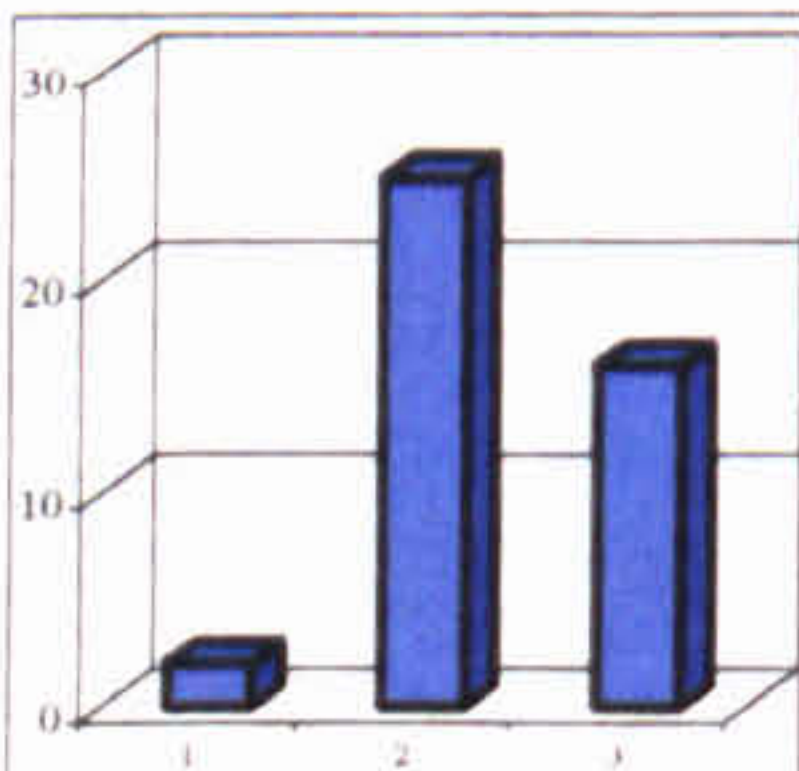
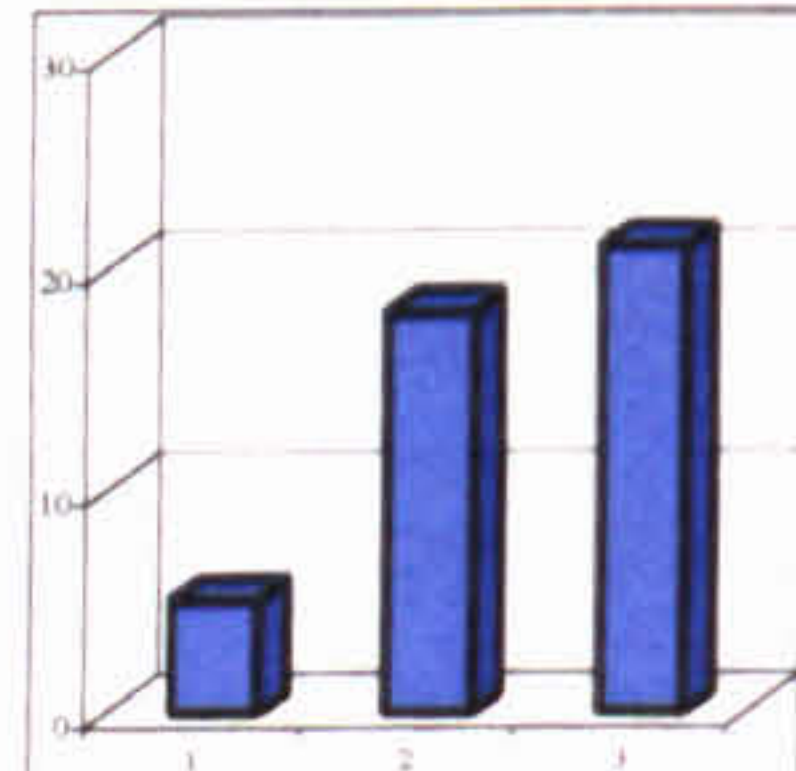
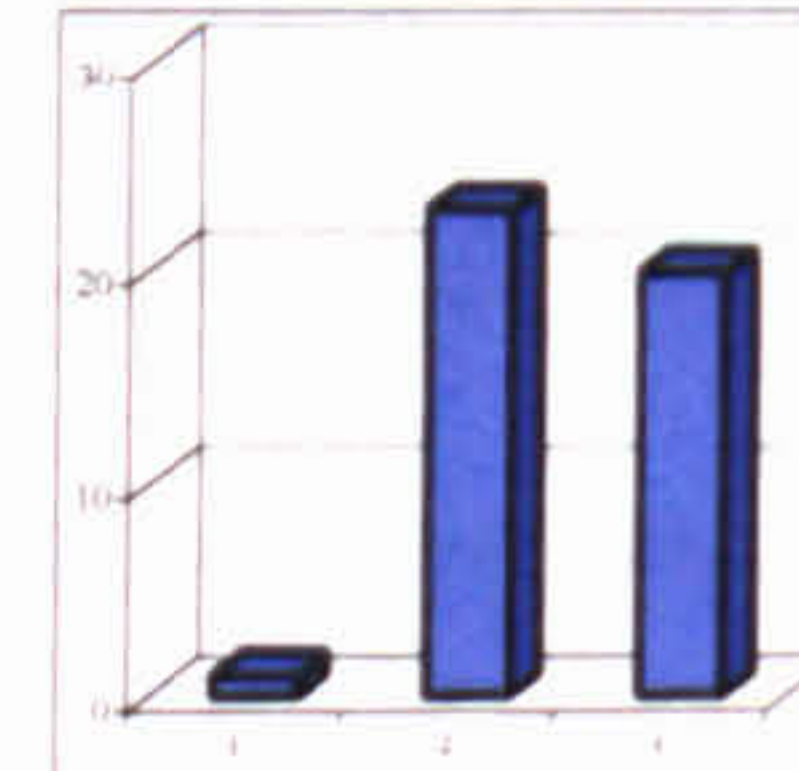
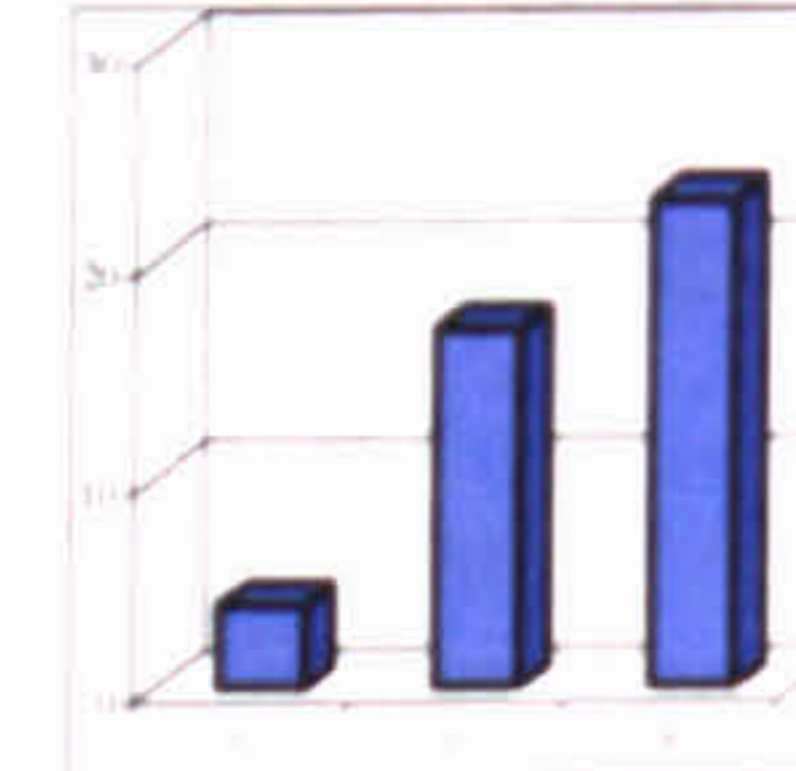
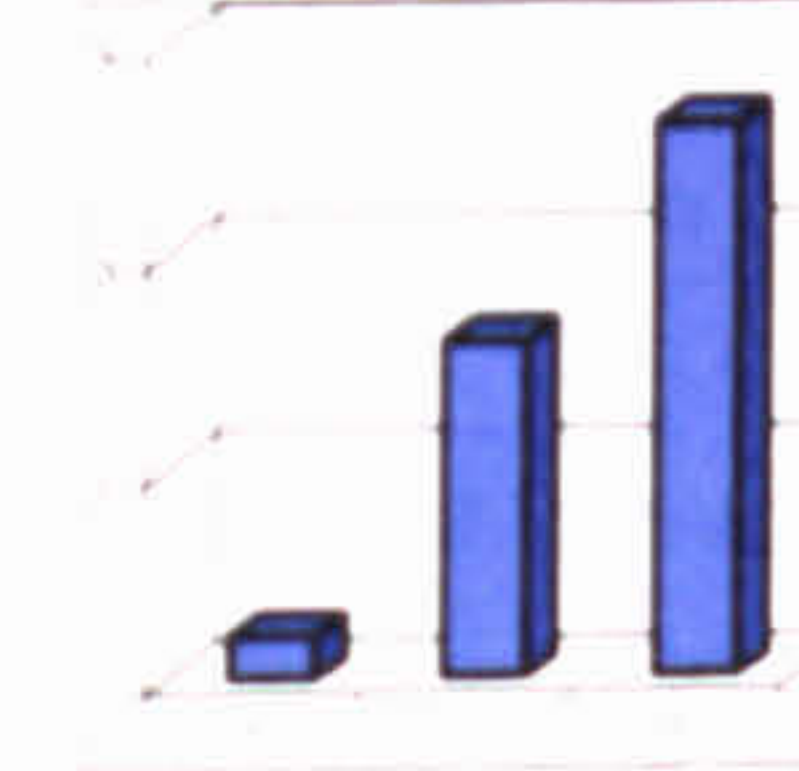
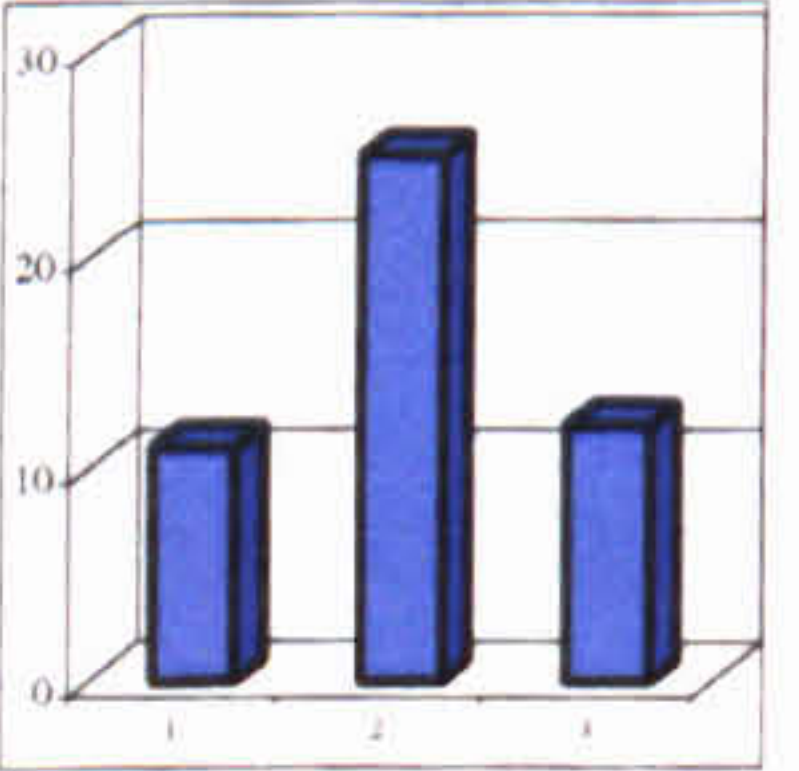
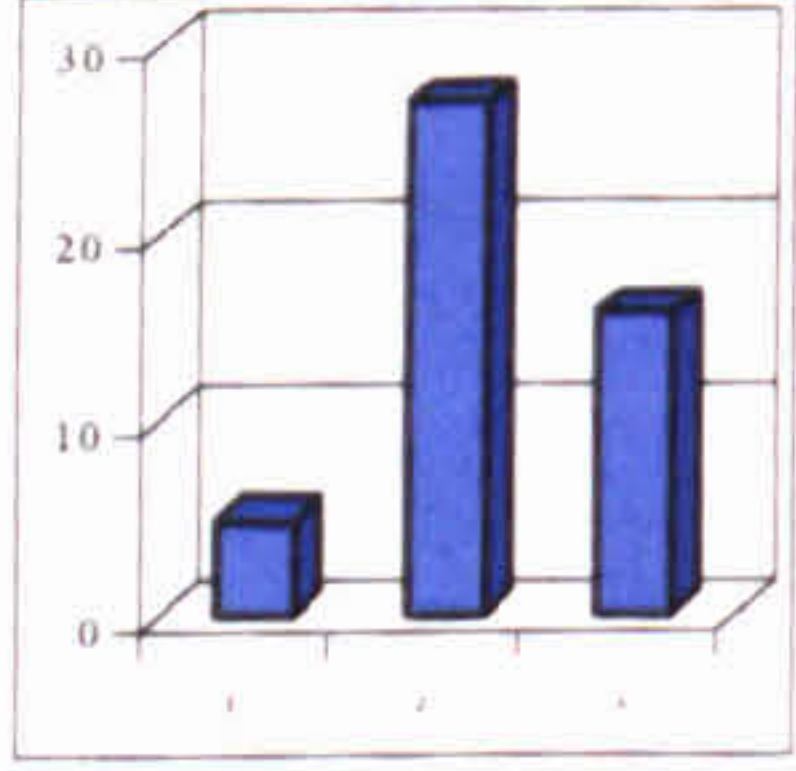
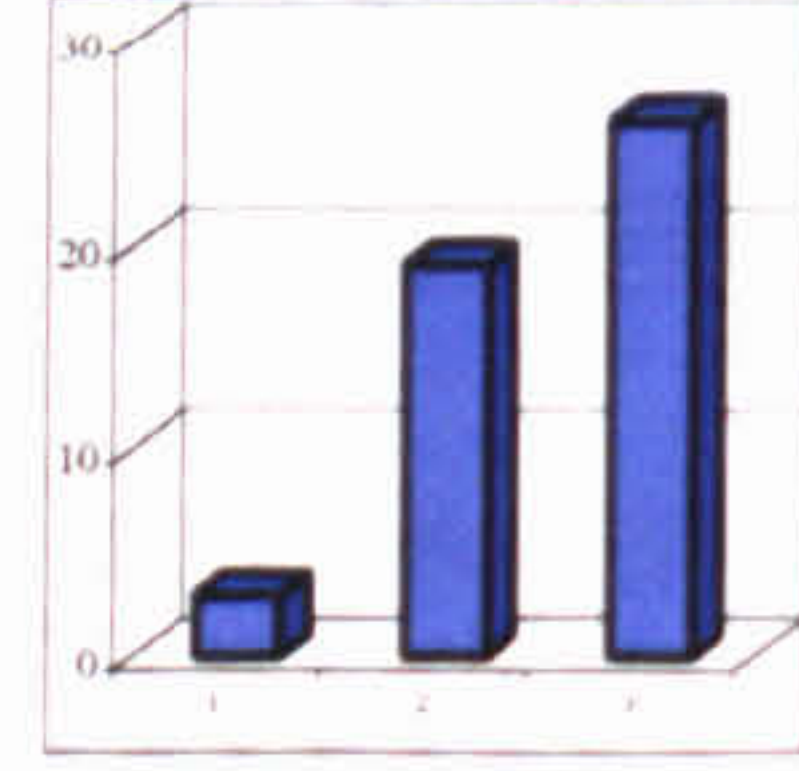
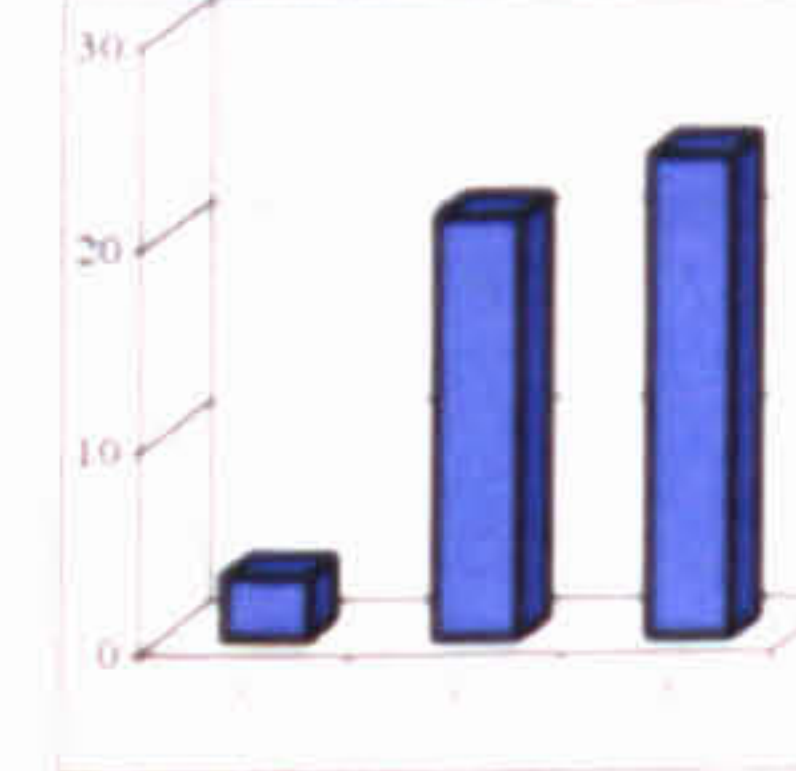
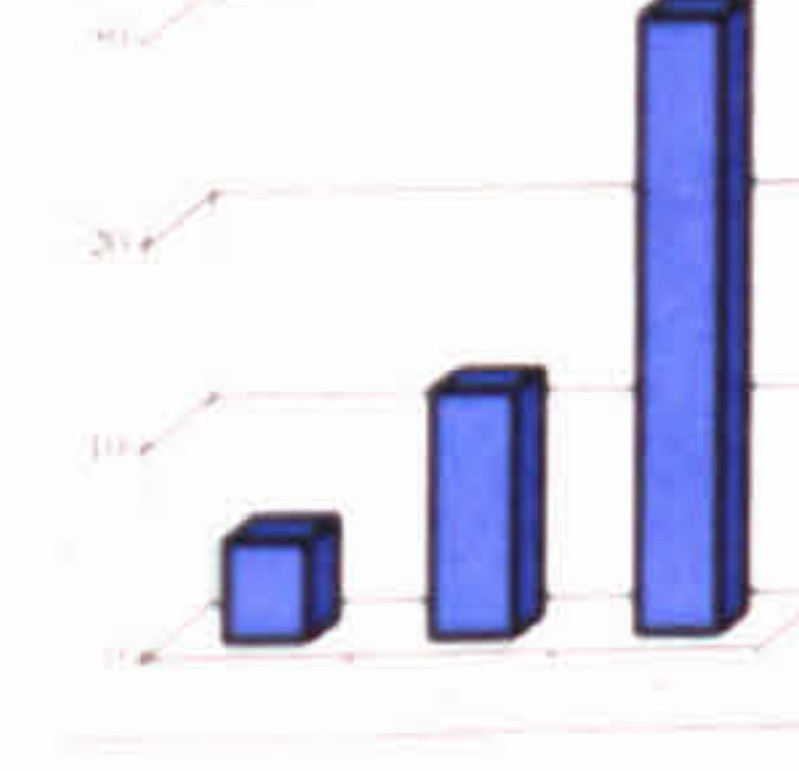
There were 44 students in sample A who completed the profile and 48 students in sample C. The data collected and analysed included both the values given to each of the 5 profile categories and the comment made for each category, for all students responding. For the numerical part of the profile (5 separate rankings from 1 to 3), the number of possible different 'profiles' was 243. Within that total, sample A respondents produced 32 different profiles and sample C gave 30 different profiles. Together, the combined samples of 92 students produced 53 different profiles.



This suggested that each sample had produced a largely different set of writer profiles, namely 23 produced by sample A only, a further 21 by sample C only, and 9 profiles by both samples.

The full range of values from 1 to 3 was used and the distribution across that range, together with mean rankings for each of the five categories, is given in Table 6.3. There was a statistically significant difference between the two samples only for the ‘Social Environment’ category and there were two categories where the distributions for sample A and sample C were almost identical, namely ‘Long-Term Memory’ and ‘Cognitive Processes’.

**Table 6.3** Mean values and distribution of ratings for each category of the writer profile for experimental samples

<i>The Social Environment</i>	<i>Motivation /Affect</i>	<i>The Physical Environment</i>	<i>Long Term Memory</i>	<i>Cognitive Processes</i>
<i>sample A</i>				
				
Mean = 2.30	Mean = 2.36	Mean = 2.43	Mean = 2.43	Mean = 2.55
<i>sample C</i>				
				
Mean = 1.98	Mean = 2.23	Mean = 2.48	Mean = 2.44	Mean = 2.54
Pearson r = 0.664 n = 44 p = .000** (two tailed)	Pearson r = 0.189 n = 44 p = .220 (two tailed) NS	Pearson r = -0.22 n = 44 p = .154 (two tailed) NS	Pearson r = -0.17 n = 44 p = .265 (two tailed) NS	Pearson r = -0.18 n = 44 p = .181 (two tailed) NS

\*\* = significant at p<.01 level

NS = not significant

### The social environment

For both samples, the social environment element had the lowest mean grading of all the profile elements and the most frequently chosen value was 2. All the comments which were made, related



to consultation with others, always with peers and sometimes also with a tutor. Only a single respondent also made reference to the influence of the expectations of the audience to whom the writing was directed.

There was a difference between the two samples in the proportion of the chosen values of 1 and 3 (sample A, 5% for value of 1 and 36% for value of 3; sample C, 23% for value of 1 and 25% for value of 3). An examination of the comments given indicated that for sample C there was a clear distinction between those giving a rating of 1 and those giving a rating of 3. The former group suggested that the consultation with peers was only occasional, whereas those giving a rating of 3 were emphatic that consultation with peers was always carried out and that it was “very” or “extremely” beneficial. With sample A, the small number who valued the social environment at 1 also largely undertook consulting only when they were “having real problems”, whereas those giving a value of 3 consulted more frequently but indicated this less emphatically than the similar group from sample C. It was clear, therefore, that an increase in the value of the social environment category coincided with an increase in the frequency with which peer consultation took place.

There were two other categories of comment which accompanied the more general one of peer consultation and each was given by around half of the respondents across both samples. They were the slightly contradictory views that firstly consultation with others was used to reassure themselves that they were on the right track, and secondly that some students were finding less of a need to consult as they progressed through their course (for example, sample A students suggested that although they often liked to consult with peers, it was perhaps overdone). This latter finding was associated more with lower value ratings than with higher value ratings.

In this study, the interpretation of the social context was biased towards the act of consultation with the peer group. In his description of the Social Environment element of his model of writing, Hayes (1996) suggested it included a wider influence of all the aspects of sharing with, and listening to, others, collaborating or writing for others, as well as recognising the influences of

other people on an individual's writing approach. The wider perspective was not apparently taken into account in this first attempt by students to produce their own writer profile in the present study.

### **Motivation/affect**

The motivation element had the second lowest mean grading of all profile elements for both samples. There was a consistent expression of difficulty in getting started on a piece of writing from both sample A and sample C, irrespective of the grading given. Comments indicated that motivation was sometimes hard to sustain through to the completion of course-related writing. Some of the other comments, however, did appear to show some differences depending on the value given in this category. For instance, almost all examples of a value of 1 related to the students admitting to having low motivation for writing and being unwilling to produce drafts before a final submission. These students were sometimes quite explicit in their lack of personal motivation (*"I do the task because I have to"*, *"If it has to be marked it has to be done"*).

Where the students had given a value of 3, there were two types of comment. One type related to strong feelings about writing *per se* (*"I like the excitement of writing"*, *"I panic"*) and other comments were about task completion (*"I worry it will not be good enough"*, *"I feel proud when it is finished"*). The students who gave the motivation element the highest value generally made comments which were more personal and referred to attributes such as 'confidence', 'anxiety', 'apprehensiveness' and 'being challenged'. Comments which were associated with a value of 2 made little reference to these attributes, and were focused more on the task (*"I try to get things done ahead of time"*). There were also several students who gave a value of 2 and who indicated that their motivation increased as they proceeded with the task.

With the noticeable differences between the comments associated with the high and low values given to the motivation element it appeared that this category of the writer profile could be a useful



indicator of a writer's affective state associated with a writing task. Such information could be a helpful indicator during the teaching of writing to help identify individuals where teacher support could be given to encourage more poorly motivated writers.

### **The physical environment**

The choice of a value by students for the physical environment category was largely split between 2 and 3, with very few respondents in either sample suggesting a value of 1. The comments given by both groups reflected only minor differences between those selecting a value of 2 or a value of 3. There was also a strong similarity between the responses sample A and sample C. In the majority of cases, both samples mentioned that one of the key features of the physical environment was verifying their understanding the task, usually through reading, re-reading and checking back at the wording of the task set. Both samples also indicated the need to gather relevant resources to answer the task and to plan a structure for their writing. About a third of sample A made reference to the arrangements within their workspace, such as the need for silence or music or a computer, as having a significant influence on their writing, with slightly fewer of sample C indicating likewise.

Only two respondents in sample A and five in sample C mentioned looking at what they had previously written. This was the aspect of the physical environment to which Hayes (1996) made most reference when elaborating his model of writing on which this profile is based. In this study appeared that the students had not been able to integrate this aspect of their own writing into their first attempt at a writer profile. In further use of the writer profile, there might be encouragement for more attention to be devoted to what had already been written, as an important area for the development of writing in the classroom.

## Long-Term Memory

The two samples of students were very similar in their comments and values for this category of the writer profile and the tendency was to choose the higher values. Most students reported remembering their own past experiences, their ideas and knowledge, and aspects of their preceding coursework. The majority of comments indicated either recalling previous knowledge of experiences as a part of general life experience (45% - 50% of each sample) or information specifically linked to course input and its associated reading (35% - 40% of each sample). There were relatively few comments about specific knowledge concerning writing skills or styles (less than 10% in each sample) and in the main, long-term memory seemed to be viewed as a store of material concerned more with content than with procedures of writing. There were also occasional comments about how difficult it sometimes was to remember specific information, usually from previous reading or coursework.

In addition to the comments about knowledge and experiences retrievable from long-term memory (LTM), there was a substantial minority of comments (about 15% across the two samples) where an understanding of the contribution, or of the meaning, of LTM was in doubt. Many of these students referred only to undertaking further reading with no indication of how they might attempt to recall what they had already read. Others made comments about developing themselves and their “*ways of thinking*” with the aid of their LTM. Sample A also produced comments not found in sample C which suggested that some students did not use their long-term memory while writing or that it was unimportant to do so. It was concluded that the difference between the two samples noted in question 5 at stage 1 of this study about what they thought memory meant in the context of writing, was again reflected in their writer profiles. At both stages, it appeared that there were more students in sample A who did not have a good understanding of LTM. Almost all of the comments indicating a poor understanding of LTM were linked with a recorded value of 1 for this category and this might be afford a further opportunity for using the Writer Profile to identify writers for whom further advice or instruction could be given by their teachers.



## Cognitive processes

The cognitive processes element obtained the highest mean score of all, for both sample A and sample C. The distribution of values was largely comparable for the two groups as were the comments about the cognitive processes involved. There were also more indications of a value of 3 than for any other category in the writer profile.

Around 60 % of both samples identified planning as part of the cognitive processes and around 45% of sample C (but very few in sample A) made reference to editing or rewriting. The importance of establishing a structure for writing was specifically mentioned by about 20% of both samples and all those who did so accorded a value of 3 to this category. Only relatively few students mentioned such specific cognitive processes as choosing, deciding, clarifying concepts and making links and there was only a single student who identified the concept of transforming (rather than transmitting) information as a part of producing new writing. There was a small minority of students who commented on reflecting as a cognitive activity and on trying to produce work which related to “new ideas and concepts”. Others indicated making considerable effort in concentrating on “new information”.

Although the numbers were small there was a noticeable difference between those who valued this category at 1 compared with the other students. For instance, they suggested engaging in a relatively lower level of cognitive activity (*“break the task into simple sections and slot them in to the finished essay”*) or identified a peripheral rather than a core cognitive activity (*“decided on a style”*) for writing. These differences offer a useful opportunity for the identification of writers who could be given further help to identify the meaning and importance of the relevant cognitive processes in writing.

## Conclusions from analysis of writer profile categories

From the analysis of the written comments within the writer profile it was clear that most students were able to identify the general concept for each category although it was felt that, for some, their comprehension was occasionally limited. Selecting a value for each category may also have been confusing for some, at the first attempt. For example, in the social environment element fewer sample A students gave a value of 1 than those in sample C but for both groups the responses indicated that the same views were held about using peer consultation only occasionally. In the long-term memory category and in the cognitive processes category those attributing a value of 1 seemed to have less well developed understanding of the key concepts than those suggesting a higher value.

Although sometimes arising from small samples and despite having been produced from ‘first time use’ of the writer profile, there was a clear indication that the writer profile might help in identifying actual or potential weaknesses in a metacognitive understanding of writing. The following are the most noticeable areas for possible further investigation, arising from this study.

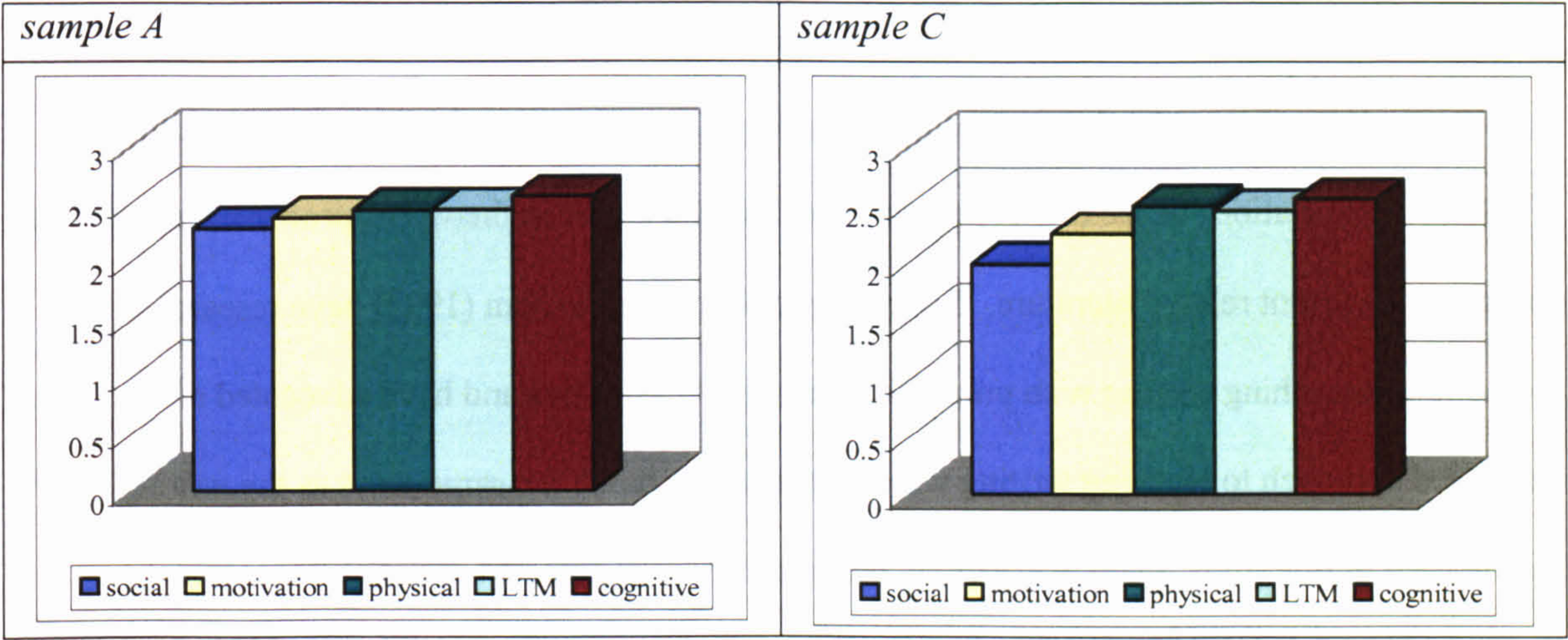
1. A value of 1 in the social environment category has indicated limited collaboration in the regulation of writing output.
2. A value of 1 in the motivation/affect category has been linked with low levels of motivation for writing.
3. A value of 1 in the long-term memory category has indicated a poor understanding of LTM in the creation of new writing.
4. A value of 1 in the cognitive processes category has been associated with limited awareness of the relevant cognitive processes in writing.

## Average profile of a writer

In addition to the individual profiles, an average profile for each of the two samples was calculated using the mean ratings for each of the five categories and these are shown in Table 6.4.

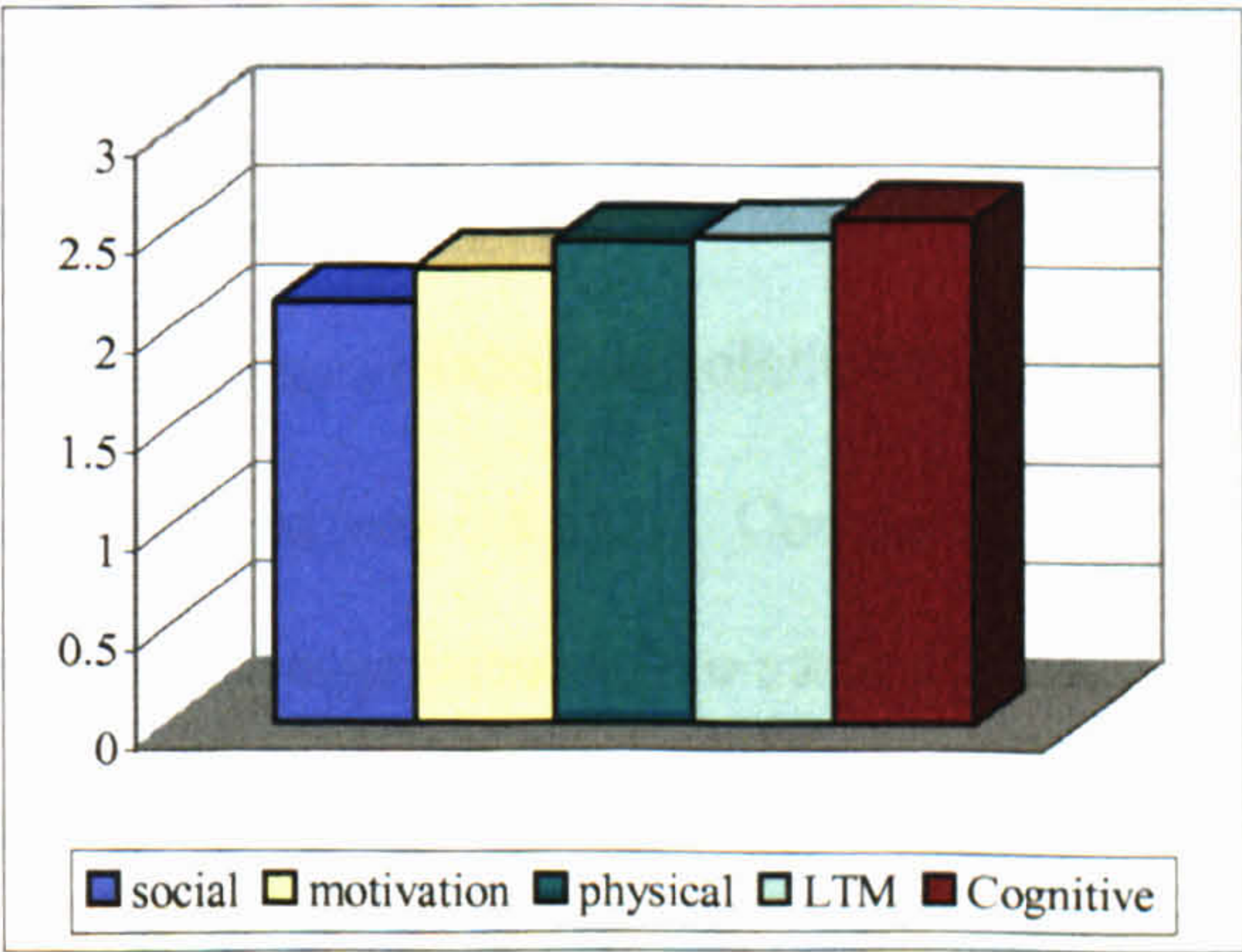


**Table 6.4** Average writer profiles for experimental samples



Both samples created broadly similar average profiles with mean ratings for each of the five categories very nearly in the same order; ‘social environment’ and ‘motivation/affect’ at the lower end and ‘cognitive processes’ at the higher end. The average profile for the combined group (Table 6.5) confirms the position of the five categories in the profile. However, writer profile information from other groups of students or from the population more widely, is now needed to set this profile in a wider context (pupils’ writer profiles have been collected and are introduced in Chapter 8).

**Table 6.5** The average writer profile combined experimental sample



The position of the social environment element is particularly interesting. As indicated above, the majority of comments made under this heading in the student’s writer profiles related to sharing with peers. The emphasis on this form of sharing was encouraged and supported by the Language Studies Department during the writing course taught to the students, and yet for their own profile of



a writer, the students valued this aspect of the writer at the lowest level. This seemed to support the indication at stage 4 where some students were beginning to express a view that sharing produced little actual change in their writing output. This view seems to be more firmly held at stage 6.

Clearer explanations of the relative positions of the categories in the writer profile have not been found in the current related literature. For example, Harris & Graham (1992) have researched the promotion of teaching writing with pupils with learning disabilities and have advocated an integrated approach to teaching writing which covers very much the same areas as the writing profile used in this study, namely affective, behavioural, cognitive and social and ecological factors. Their work was also substantially related to promoting self-regulation, but did not appear to identify the relative positions of these areas in their students' self-regulatory actions in the process of writing and therefore could not confirm the findings of the present study.

Some recent work by Schultz & Fecho, (2000) has given more attention to the social factors in relation to writing. They have argued for greater recognition of social interaction in the teaching of writing particularly through promoting writing development with young children in the classroom. They support the theoretical position of Vygotsky, where the social influence of learning is initially at an inter-psychological level and their studies they have emphasised the value of collaboration in learning to write at the earlier stages in the development of writing skills in schools. They have not indicated the relevance of inter-personal learning with older learners when arguably learning has become more internalised at the intra-psychological level.

Hayes (1996) has suggested that the place of the social aspects of writing refers to the wider influence of social and cultural influence on writing as a whole, and in support, he refers to modern studies of collaborative writing in the school and in the workplace. In both of these contexts, working together promotes the development of pertinent writing skills with beneficial outcomes, such as children in schools showing an improvement in their individual skills following successful collaborative experiences. The evidence from the present study supported the view that students judged working together on writing tasks to be important and relevant particularly at the earlier



stages in the development of their skills. When the students had the confidence to become independent writers, the place of collaboration dropped to a lower level.

Further examination of the value of a writer profile was undertaken when it was compared with students' grades in writing at stage 7.

## **STAGE 7**

The assessment of students' writing was the focus of stage 7. The completion of writing tasks was part of the major data collection activities at the beginning and the end of this study (stage 1 and stage 16) but for the assessment of writing at an intervening stage it was felt appropriate to use a piece of writing which was already part of students' activities in the Language Studies Department's writing course. The writing selected was a 1000 word assignment entitled "Using stories with children" and it related to three activities. They were: to choose a story and plan related talking and listening activities; to read the story and implement the talking and listening activities; and to evaluate the experience.

Within the language course, this assessment of students' writing was used to provide information about their writing skills. For the present study, the writing was separately evaluated and the findings were examined along with the students' writer profile (stage 6) and with their reflective reports on an earlier writing task (stage 4). Comparison with earlier and later writing grades was carried out at stage 16.

## **Data analysis**

The students submitted their completed writing tasks to members of the Language Studies Department who carried out the assessment of students' writing against the following criteria:

1. Evaluation of texts – appeal and suitability.
2. Justification of activities – language integrity and value.
3. Justification of activities – appropriateness for pupils
4. Communication and presentation.

The timing of the writing task enabled the students to know whether they had been graded as successful or unsuccessful writers (marked on a Pass/Fail basis) just prior to the completion of their writer profile in stage 6. For this study, the staff from the Language Studies Department agreed to assess each student's submission in greater detail under each criterion and this was available only *after* the completion of the writer profile. On the advice of the Language Studies Department staff, the more detailed assessment of each piece of writing was marked thus: criteria 1, 2 and 3 out of 6, and criterion 4 out of 3, producing a maximum total of 21. Because of the potentially smaller number of students when comparisons were made with data from stage 4 and stage 6, the numerical scores were clustered into five grades as follows:

		<i>Sample A</i>	<i>Sample C</i>
Grade 1 (poorest)	(numerical score of between 0 and 7)	3 students	7 students
Grade 2	(numerical score of between 8 and 10)	7 students	15 students
Grade 3	(numerical score of between 11 and 14)	19 students	17 students
Grade 4	(numerical score of between 15 and 18)	17 students	18 students
Grade 5 (best)	(numerical score of between 19 and 21)	12 students	15 students

### **Data analysis - comparison of grades for writing with the reflective report on writing**

The three questions at stage 4 of the study asked students to reflect on: the knowledge they had used in tackling a writing task; their understanding of how they selected the most appropriate genre for a task; and the activities they undertook in establishing the content of their writing for the task. The responses to these questions were categorised under 23 headings, spread across all three questions. For a comparison with the grades for writing, it was decided to examine how often the categories of response appeared at stage 4 for the groups of students at each grade for writing (taking sample A and sample C together). Only those students, for whom *both* the writing grade



and the responses to stage 4 were available, have been included in this analysis (130 students across the two samples).

The data are presented in Tables 6.6, 6.7 and 6.8. Because some of the numbers of responses are very small, the data include the *relative* frequencies of each response category response *per student*. Where there are categories with no respondents, the use of a statistical test of significant difference was taken as not appropriate.

**Table 6.6** Number of responses to stage 4 question 1 (relating to knowledge of the task) for each stage 7 writing grade with relative frequencies of occurrence per student in each grade

<i>Response category</i>	<i>Grade 1</i>	<i>Grade 2</i>	<i>Grade 3</i>	<i>Grade 4</i>	<i>Grade 5</i>	<i>Chi-square</i>
<b>Number of students</b>	<b>10</b>	<b>22</b>	<b>36</b>	<b>35</b>	<b>27</b>	
Checked understanding of the question	4 (0.40)	1 (0.05)	15 (0.42)	11 (0.31)	16 (0.59)	44.215**
Had a plan for writing	2 (0.20)	1 (0.05)		1 (0.03)		not valid
Used own ideas	1 (0.10)	2 (0.09)	2 (0.06)	1 (0.03)	5 (0.19)	15.447**
Thought about what to do	1 (0.10)	2 (0.09)	1 (0.03)	3 (0.09)	5 (0.19)	13.200**
Worked on it with peers	6 (0.60)	9 (0.41)	20 (0.56)	17 (0.49)	22 (0.81)	15.770**
Read extra material	1 (0.10)	7 (0.32)	5 (0.14)	7 (0.20)	10 (0.37)	23.681**
Referred to course material	1 (0.10)	8 (0.36)	9 (0.25)	12 (0.34)	24 (0.89)	92.031**
Used own past experience	1 (0.10)	8 (0.36)	7 (0.19)	11 (0.31)	11 (0.41)	23.547**
Consulted course tutor	1 (0.10)	1 (0.05)	3 (0.08)	3 (0.09)	4 (0.15)	5.660 NS
Was unsure or did not know			1 (0.03)		2 (0.07)	not valid

Categories with largest difference between lowest and highest grades

\*\* = significant at  $p < .01$  level  
NS = not significant

The figures in Table 6.6 for the distributions across all writing grades indicated statistically significant differences (Chi-square) based on the frequency of responses per student, for all response categories except one, 'consulted a course tutor', or where there are missing values. As the calculations were carried out on single response categories it was possible to discern that the differences were the result of numbers of responses per student increasing with the higher writing grades; that is, the higher graded students usually produced the largest number of responses. A qualitative examination of the responses given in the response categories with the largest differences between high-scoring and low-scoring students (highlighted in Table 6.6) was also carried out and this is summarised in Table 6.9.



**Table 6.7** Number of responses to stage 4, question 2 (relating to the genre adopted) for each stage 7 writing grade with relative frequencies of occurrence per student in each grade

<i>Response category</i>	<i>Grade 1</i>	<i>Grade 2</i>	<i>Grade 3</i>	<i>Grade 4</i>	<i>Grade 5</i>	<i>Chi-square</i>
<b>Number of students</b>	<b>10</b>	<b>22</b>	<b>36</b>	<b>35</b>	<b>27</b>	
Checked understanding of the question	1 (0.10)	4 (0.15)	1 (0.03)	3 (0.09)	7 (0.26)	23.587**
Chose a style	3 (0.30)	6 (0.27)	10 (0.28)	9 (0.26)	8 (0.30)	0.454 NS
Used own past experience	3 (0.30)	8 (0.36)	12 (0.33)	14 (0.40)	20 (0.74)	30.216**
Worked on it with peers	2 (0.20)	7 (0.32)	8 (0.22)	11 (0.31)	6 (0.22)	5.008 NS
Referred to course material	1 (0.10)	4 (0.18)	6 (0.17)	6 (0.17)	6 (0.22)	4.452 NS
Consulted a course tutor		2 (0.09)	2 (0.06)	4 (0.11)	5 (0.19)	not valid
Used own ideas	1 (0.10)		1 (0.03)	1 (0.03)	2 (0.07)	not valid
Read extra material	1 (0.10)	1 (0.05)	2 (0.06)	4 (0.11)	9 (0.33)	40.462**
Thought about what to do		2 (0.09)		2 (0.06)	4 (0.15)	not valid
Was unsure or did not know	1 (0.10)	1 (0.05)	1 (0.03)	1 (0.03)	3 (0.11)	9.250 NS

\* = significant at  $p < .01$  level

NS = not significant

Categories with largest difference between lowest and highest grades

**Table 6.8** Number of responses to stage 4, question 3 (relating to deriving the content) for each stage 7 writing grade with frequencies of occurrence per student in each grade

<i>Response category</i>	<i>Grade 1</i>	<i>Grade 2</i>	<i>Grade 3</i>	<i>Grade 4</i>	<i>Grade 5</i>	<i>Chi-square</i>
<b>Number of students</b>	<b>10</b>	<b>22</b>	<b>36</b>	<b>35</b>	<b>27</b>	
Checked understanding of the	1 (0.10)	7 (0.32)		7 (0.20)	7 (0.26)	
Read extra material	1 (0.10)	8 (0.36)	14 (0.39)	18 (0.51)	13 (0.48)	28.554**
Looked at relevance of material	3 (0.30)	8 (0.36)	13 (0.36)	14 (0.40)	10 (0.37)	7.881 NS
Ensured knowledge linked together	1 (0.10)	4 (0.18)	1 (0.03)	4 (0.11)	5 (0.19)	14.000**
Used own ideas	2 (0.20)	10 (0.45)	13 (0.36)	13 (0.37)	12 (0.44)	9.921*
Had a plan for writing	4 (0.40)	7 (0.32)	9 (0.25)	9 (0.26)	14 (0.52)	14.400**
Used own past experience	2 (0.20)	4 (0.18)	12 (0.33)	6 (0.17)	5 (0.19)	8.093 NS
Used a structure to writing	4 (0.40)	6 (0.27)	7 (0.19)	8 (0.23)	11 (0.41)	13.333**
Worked on it with peers	5 (0.50)	12 (0.55)	31 (0.86)	32 (0.91)	27 (1.00)	26.403**
Referred to course material		5 (0.23)	9 (0.25)	10 (0.29)	9 (0.33)	not valid
Found understanding was extended	1 (0.10)	6 (0.27)	11 (0.31)	12 (0.34)	16 (0.59)	38.598**
Consulted a course tutor		3 (0.14)	1 (0.03)	5 (0.14)	2 (0.07)	not valid
Made sure context was right	1 (0.10)	1 (0.05)			2 (0.07)	not valid
Did not have confidence in myself					3 (0.11)	not valid
Looked at flow and sequence		2 (0.09)	1 (0.03)	2 (0.06)	5 (0.19)	not valid
Drafted and revised		1 (0.05)	8 (0.22)	6 (0.17)	3 (0.11)	not valid
Self-corrected or proof read		2 (0.09)	3 (0.08)	1 (0.03)	3 (0.11)	not valid
Was unsure or did not know	1 (0.10)		1 (0.03)	1 (0.03)	2 (0.07)	not valid

\*\* = significant at  $p < .01$  level

\* = significant at  $p < .05$  level

NS = not significant

Categories with largest difference between lowest and highest grades

Tables 6.7 and 6.8 giving summaries of responses to questions 2 and 3 at stage 4 showed a similar trend of more responses per student made by those with higher writing grades than by those



with lower grades. The response categories showing the greatest differences are highlighted and the responses which the students made in these categories were qualitatively analysed and this is summarised in Table 6.9.

From these analyses, it was found that six response categories were linked with the biggest differences between the students with high writing grades and low writing grades. These were:

“checked understanding of the question” (in question 1 and question 2)

“read extra material” (in question 1, question 2 and question 3)

“referred to course material” (in question 1)

“used own past experience” (in question 1 and question 2)

“worked on it with peers” (in question 3)

“found understanding was extended” (in question 3)

**Table 6.9** Analysis of comments given at stage 4 under the six response categories showing greatest difference between students with highest and lowest writing grades at stage 7

<i>Response category</i>	<i>Type of comments from students with lower writing grades</i>	<i>Type of comments from students with higher writing grades</i>
Checked understanding of the question (procedural knowledge)	Indications of reading the task over more than once	Firm statements on checking the wording with greater emphasis on ‘reading then re-reading’ the task
Read extra material (declarative knowledge)	Rather imprecise statements about what extra material was used, such ‘looked for points that were in the literature	A closer identification of the extra material which was used as a sources of ideas for the content, such as ‘appropriate texts’, ‘recommended reading list’
Referred to course material (declarative knowledge)	Statements which included mention of class notes and other material	More specific reference to input from course on writing with some mention of focuses such as ‘how to construct an essay’ and ‘how to read a question’
Used own past experience (declarative knowledge)	General comments which include the terms ‘previous knowledge’, or ‘previous experience’	Some details of source of past experience such as ‘Higher English’, ‘writing essays of this genre’ or ‘previous studies’
Worked on it with peers (procedural knowledge)	Commonly a simple statement of sharing work with peers and getting feedback	Similar views of sharing with peers although the term ‘critical friend’ was also used
Found understanding was extended (declarative knowledge)	Comments which identified improving or ‘strengthening ideas’ through further reading	Similar comments which indicated that reading increased and ‘clarified knowledge’ and thinking

Table 6.9 indicated a consistent difference between the two groups of students in the detail of their responses at stage 4, with the high-scoring writers, as well as making more comments, being

more specific and more focused in their suggestions. This difference was more noticeable with the comments relating to declarative knowledge than with those relating to procedural knowledge. This suggested that the better writers were able to demonstrate more fully that they *knew about* key aspects of writing (such as using course material, further reading and their own knowledge and experiences) than they were able to *implement* the key procedures of writing.

### **Data analysis - comparison of grades for writing with writer profiles**

When the writer profile was being discussed with the students, they had suggested that a possible use of the profiles might be to identify those of different kinds of writers, and in particular of better and of poorer writers with a view to finding what contributed to becoming a better writer, albeit from within their own group. Although not discussed in depth at the time, it was anticipated that links between the writer profile and success in writing could be extended to examining writer profiles of the students' pupils, to provide the students with more awareness about teaching children to become better writers. The comparison between writing grades and the students' writer profiles was therefore seen as a relevant contribution to examining the students' metacognitive awareness of writing.

Of the 92 students who completed the writer profile, there was a writing grade for 89 of them, distributed across the grades and samples as follows,

	Sample A	Sample C
Grade 1 (lowest)	1 student	4 students
Grade 2	5 students	7 students
Grade 3	6 students	8 students
Grade 4	13 students	15 students
Grade 5 (highest)	7 students	13 students

The average writer profiles for the students in each of the five grades for writing were calculated using the values which had been given to each of the profile categories (summarised in Table 6.10).



**Table 6.10** Average values for each writer profile element across each grade of writing assessment

<i>Elements of writer profile</i>	Writing grade 1	Writing grade 2	Writing grade 3	Writing grade 4	Writing grade 5	Chi- square
Social environment	2.20	1.92	2.04	2.43	2.10	6.907 NS
Motivation/affect	2.80	2.00	2.38	2.32	2.20	14.906**
Physical environment	2.40	2.17	2.38	2.54	2.60	4.602 NS
Cognitive processes	2.60	2.83	2.58	2.46	2.45	3.642 NS
Long Term Memory	2.60	2.67	2.42	2.32	2.50	3.105 NS

\*\*= significant at  $p < .01$  level      NS = not significant

There was a statistically significant difference between the writing grades for only one category of the writer profile, “motivation/affect”. This appeared to have been due to students with the lowest grade valuing the motivation/affect category substantially higher than any of the other students. There were, however, only a small number of students with a writing grade of 1. Of the 5 students involved, 3 of them chose the highest value for the motivation element and the comments of each of them indicated that motivation was the drive for completing what was, for them, not an easy task.

Because of the small numbers involved, the lowest two writing grades were combined, as were the highest two, for further analysis. The average writer profiles for these two groups are in shown in Table 6.11. There was no significant difference between the two combined profiles.

**Table 6.11** Average values for each writer profile element for combined low grades of writing and combined high grades of writing

<i>Elements of writer profile</i>	Writing grades 1 and 2 combined	Writing grades 4 and 5 combined
Social environment	2.00	2.29
Motivation/affect	2.24	2.27
Physical environment	2.68	2.57
Cognitive processes	2.76	2.46
Long Term Memory	2.65	2.40

Chi-square = 4.698  
df = 4  
p = 0.320 (NS)

NS = not significant

Despite the lack of a significant difference, there were some trends in these profiles worthy of note. For example, better writers valued the social environment category of the writer profile more highly than the poorer writers. It had been noted earlier (in stage 6) that samples A and C had been

different in their patterns of response. The low graded writers from sample A had chosen high values for the social environment category whereas it was the high graded sample C writers who had chosen these profile values. Examination of the profile responses, however, indicated a noticeable difference in the comments, with the lower graded students clearly indicating their need to share and seek support from others, while the higher graded students were substantially less enthusiastic about collaboration. It was clear that the high scoring group felt less inclined to work collaboratively as they became more experienced and more confident in their own writing. The lower scoring group did not indicate this.

In the motivation category there was little difference in the values chosen by low-scoring and high-scoring writers. The analysis of the comments on this profile category indicated that the poorer writers seemed to rely substantially on motivation for completing a writing activity, whereas the better writers had a much more positive view of motivation and were more able to link it with delayed personal gain, such as the potential improvement in self-worth gained from completing demanding and challenging activities.

The physical environment category of the writing profile was given only a slightly higher value by the lower graded writers compared with the higher graded writers. An examination of the writer profile responses revealed that virtually everyone in the higher grade made repeated reference to the wording of the task but substantially less than half of those at the lower level did. All those who re-read the task reported doing so to get a better understanding of what was required. This finding is consistent with the earlier results from comparing writing grades with the responses to questions at stage 4 where checking understanding of the question was carried out significantly more often, and with greater attention to detail, by the higher scoring writers.

In the cognitive processes category, the poorer writers had selected a higher value than the better writers. Analysis of their comments indicated that more students with the higher grades than with lower grades read a lot, either generally or in specific preparation for the completion of a writing task. Additionally, there were discernible differences in the purpose for reading. The



higher graded writers used their reading to “*consolidate ideas*” and to “*select, transform and organise new information*”, whereas the lower graded writers use it to “*sort relevant information*” and to “*acquire relevant information*”. This was very similar to the finding reported from the comparison with the stage 4 questions where explicit use of extra reading material was one of the distinguishing features of the better writers.

Another feature of the cognitive processes element was a difference between high-graded and low-graded writers in the benefit they claimed to derive from their cognitive efforts. For example, there were more instances in the high-graded writers attempting to clarify their thinking and “*putting everything in the right place*” compared with those at the lower grades who felt that they were “*reviewing knowledge*” or “*getting the relevant points down*”. This finding is also consistent with that from the comparison with the data from stage 4.

In the LTM category of the writer profile the poorer writers had given a lower value than those in the higher writing grades. However, almost all the comments made in the writer profile referred to the availability of experiences from personal events, previous course work or individual reading with very little difference between the better or poorer writers. There were very few insightful views about memory at any level of writing proficiency.

In general, differences between the better and poorer writers indicated by the writer profiles were consistent with the earlier comparison with the questions from stage 4. The key findings were as follows,

1. Motivation was different for the two groups with better writers largely being motivated and driven by the expectation of successful completion of writing whereas the poorer writers recognised the need to be motivated but did not always find this easy to achieve.
2. Collaboration in a social environment was widely practiced but the poor writers depended much more on the support they obtained from this while the better writers were less inclined to believe in personal gains from these activities.

3. In the physical environment, reference back to the description of the task was a frequently reported activity and was carried out with greater attention to detail by the better writers than with the poorer writers.
4. The role of memory in writing was not an area where any student appeared to have a high level of knowledge or understanding.
5. In cognitive activities, the better writers engaged more searchingly than poorer writers, particularly in resourcing and planning for writing.

### **Discussion and conclusions from stages 5, 6 and 7**

The teaching content of stage 5 was undoubtedly difficult and demanding for the students. Despite using the data collected from their own responses at an earlier stage to emphasise their 'ownership' of a model of writing, the procedure of drawing links between the theory and practice of writing was complex and cognitively challenging. This activity was seen as particularly relevant, however, in promoting a metacognitive approach to thinking about writing. The application of the model of writing to a writer profile derived from the students' own interests and should have been supportive in identifying some of the theory-practice links. However, it was clear that this stage of the study was not easy for students in the second term of the first year of BEd course.

Research on a writer profile has not been extensive. Only a handful of sources appear in the literature and they are primarily related to the assessment of students on entry to college or university courses. Work by Royer and Gilles (1998) and by Lewiecki-Wilson, Sommers and Tassoni (2000) had collected evidence from students on their strengths and weaknesses as writers in the form of a personal history of writing. In these studies the format of the information collection was largely student-determined although the students were given advice about how to start and how to proceed through drafts to the final version for submission. In this way, the students provided information which was a description of themselves as writers (a writer profile) and, as Royer and Gilles, and Lewiecki-Wilson *et al* indicated, the profiles were used to determine



student needs for their placement on writing courses. In the present study, the purpose of the profile of a writer was similar in some respects, for example in reporting on strengths and weaknesses and in its potential in aiding the development of individual writing skills. It was also different in that the students involved had already started on a course about teaching writing and were therefore already aware of what was involved in thinking metacognitively about their own writing skills.

A strength of a writer profile based on the Hayes model of writing is that it promoted an approach to learning about writing which directly addressed the motivational, cognitive, social, environmental and personal (memory) influences on the writing process. This was similar to the integrated approach to instruction about writing adopted by Harris and Graham (1992) and which addressed the affective, cognitive, social, behavioural, and ecological processes. Harris and Graham referred to their approach as “self-regulated strategy development”. The use of a writer profile in the present study was seen as also potentially contributing to the development of regulation (or self-regulation) in writing. The evidence for this was found in the examination of the data about the students’ writing grades as they were compared with the earlier responses on reflecting on writing (stage 4).

The stage 7 comparison of high-scoring writers with low-scoring writers using the data from stage 4 has indicated an important difference between the two groups. The evidence showed that the two groups had different views of themselves as writers, notably in the context of surface or deep level thinking, with the better writers undertaking consistently deeper processing than the poorer writers. The findings from stage 4 had already indicated that a minority of students appeared to be aware of effective monitoring within the regulation of personal writing. These findings were linked to the findings of Vermunt (1988), that deep processing was related to higher levels of self-regulation of the learning process. This led to the expectation that it was the students who were the higher graded writers who were already more aware of their own role in regulation of writing. This was confirmed by the data analysis in stage 7 where it was found that the better



writers were those whose responses at stage 4 had indicated an awareness of monitoring actions in the regulation of writing.

It seemed likely, therefore, that the writer profile might contribute to identifying those writers who were already aware of self-regulation in writing, but perhaps more importantly, to identifying those who could be helped to become more proficient in self-regulation.

This conclusion goes some way to addressing the expressed wishes of the students that a writer profile might be helpful in identifying ways of supporting poorer writers in becoming better writers. The ways in which a writer profile might be used in this context require to be more fully investigated. The indications from the small samples in this study are that the overall profiles of poorer or better writers are not significantly different but that there are observable differences in some of the profile categories. From the evidence collected in this study, the comments given by the students in the cognitive processes category seemed to suggest a greater awareness of how to improve personal writing, but this is not necessarily reflected in the value grading given to this category of the profile.

It seems appropriate that all aspects of the writer profile should be examined more fully and a wider range of data collected to establish its contribution to the development of teaching writing.

## **Summary**

Stages 5, 6 and 7 included the second teaching session and introduced the concept of a model of writing along with how that might be used to understand the writing process. The Hayes (1996) model of writing was used and was explained on the basis of observations which students had made about themselves as writers at an earlier stage. Its use as a profile of a writer was elaborated and included how it might be useful to help the students identify the profile categories of successful writers in their own group.



Of the two data collection sessions, the first was the completion by the students of their personal profile of a writer. The average profile for the whole group was compiled and the data from the whole group were analysed on both the basis of the numerical value given to each element of the writer profile and the comments provided for each category. The conclusion was that the writer profile could potentially be used in supporting all writers (though poorer writers in particular) to become better writers through the promotion of self-regulation in writing. The consequence of this might be that a writer profile could make an important contribution to an individual's developing metacognitive model of writing.

The second data collection session was based on a re-analysis of students' writing which had been carried out for the Language Studies Department. These pieces of writing were re-assessed by the specialist staff from that department to provide more detailed information than had been planned for their original use. From this activity a writing grade was produced for each student on a scale of 1 to 5.

The writing grades obtained for each student were compared with earlier responses made about the metacognitive knowledge used in a writing task and the monitoring activities employed. A comparison was also made between the writing grade and the writer profile of each student. The results of these two comparisons indicated differences between high-graded writers and low-graded writers. In relation to the earlier reflective responses, the higher graded writers produced larger numbers of, and more detailed, comments. These were interpreted to be more indicative of deep processing than was shown by the lower graded writers. The difference in the writer profile reflected a similar variation in deeper versus surface level thinking.

Opportunities for further research were identified in a more detailed examination of all aspects of the writer profile and its wider application with larger samples.







## **Chapter 7**

### **Stages 8 and 9 Metacognitive awareness**

#### **Function**

The intention of stages 8 and 9 was to extend students' knowledge and understanding of metacognition and to assess their metacognitive awareness of writing using a single objective measure. This was undertaken through one teaching session and one data collection activity.

In the preceding stages of this study, the teaching and the data collection had focused on the students themselves as writers, but in the stages which followed, this would change to teaching writing in the classroom. The teaching session therefore undertook to explain the term 'metacognition' and to describe a model of metacognition which identified both knowledge and regulation (monitoring and control) as its key elements. The data collection activity assessed how the students' metacognitive awareness might have progressed from a perspective of themselves as writers to one relating to their perceptions of pupils' writing in the classroom.



## **STAGE 8**

Stage 8 was a teaching session about the nature of metacognition with the emphasis on metacognitive awareness. The teaching was therefore aimed at extending students' understanding of both metacognitive knowledge and the processes of monitoring and control. Both the earlier model of metacognition proposed by Flavell (1976), and the more recent one suggested by Nelson and Narens (1994), were introduced and described.

### **Structure and content of the teaching**

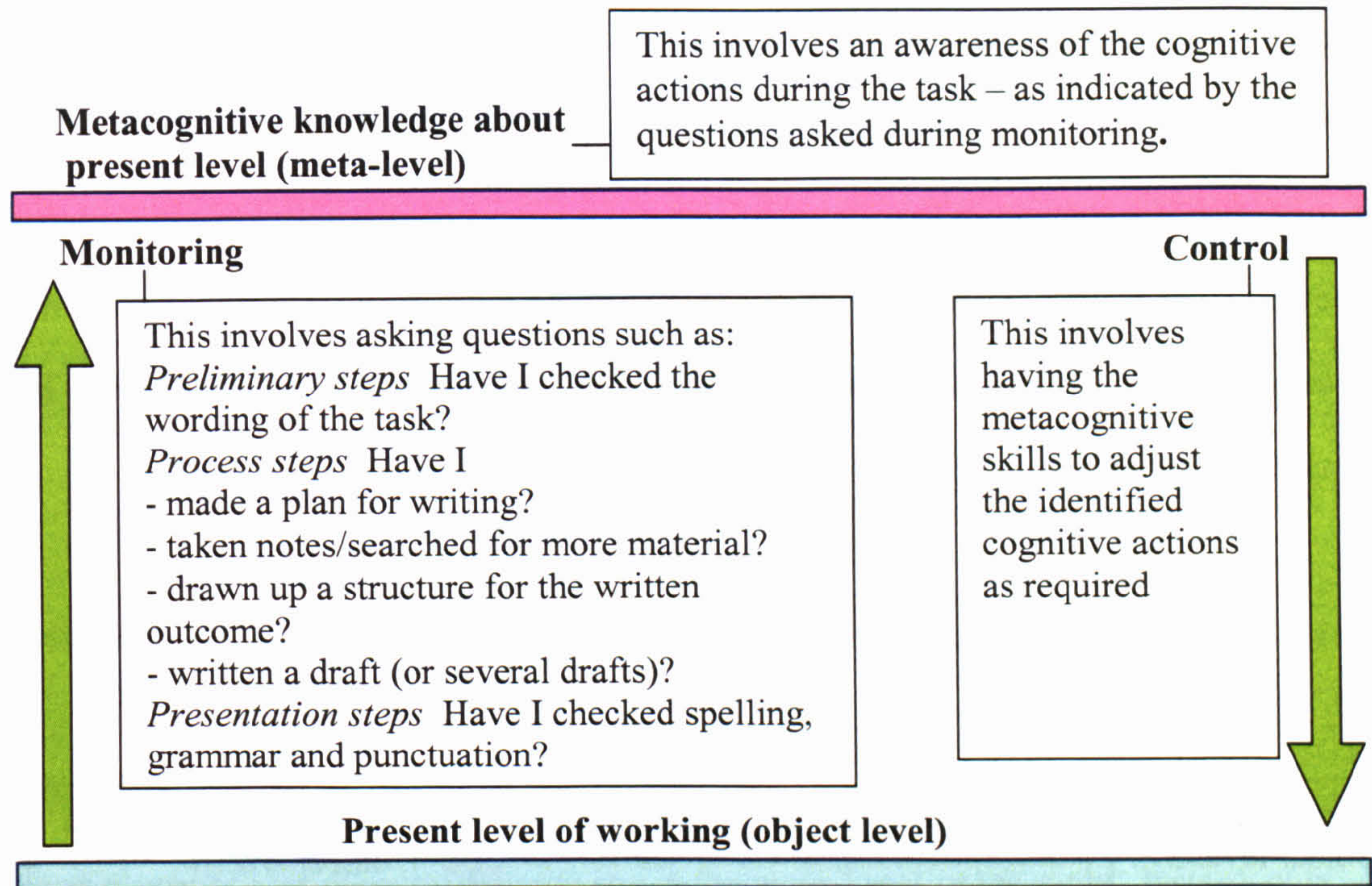
There were three major elements in the teaching session. The first was an elaboration of the meaning of the term 'metacognition' and its relationship with thinking, knowing and learning. It included how the concepts of knowledge and regulation (monitoring and control) might be interpreted within a metacognitive approach to writing. The second was the presentation and explanation of the Flavell (1976) model and the Nelson and Narens (1994) model of metacognition. The third was the extension of a metacognitive perspective of students' own writing to include a metacognitive perspective of teaching writing in the Primary school classroom.

The term 'metacognition' was explained as more than knowing, thinking and learning, but as knowing about knowing, thinking about thinking and learning about learning. The explanations were contextualised through using data collected from the students at stage 1 and stage 4. In this way it was hoped that the students would identify a metacognitive approach to writing as being closely linked with their current ideas on writing. The specific examples used aimed to integrate students' knowledge (from stage 1) with their reflections on writing procedures (from stage 4) to illustrate a metacognitive awareness of the process of writing. These ideas were elaborated in the context of the description of metacognition suggested by Flavell (1976) and by the Nelson and Narens (1994) model of metacognition. The 'core' model proposed by Nelson and Narens (see



Figure 2.1 in Chapter 2) was elaborated using a summary of the examples taken from the earlier stages, as indicated in Figure 7.1.

**Figure 7.1** Elaborated model of metacognition (based on Nelson and Narens, 1994)



The following features of the Nelson and Narens (1994) model were explained,

- the nature of the object level
- the functioning of monitoring procedures
- the links between monitoring and metacognitive awareness
- the nature of the meta-level
- the metacognitive skills involved in the control element
- the links between control and procedural knowledge

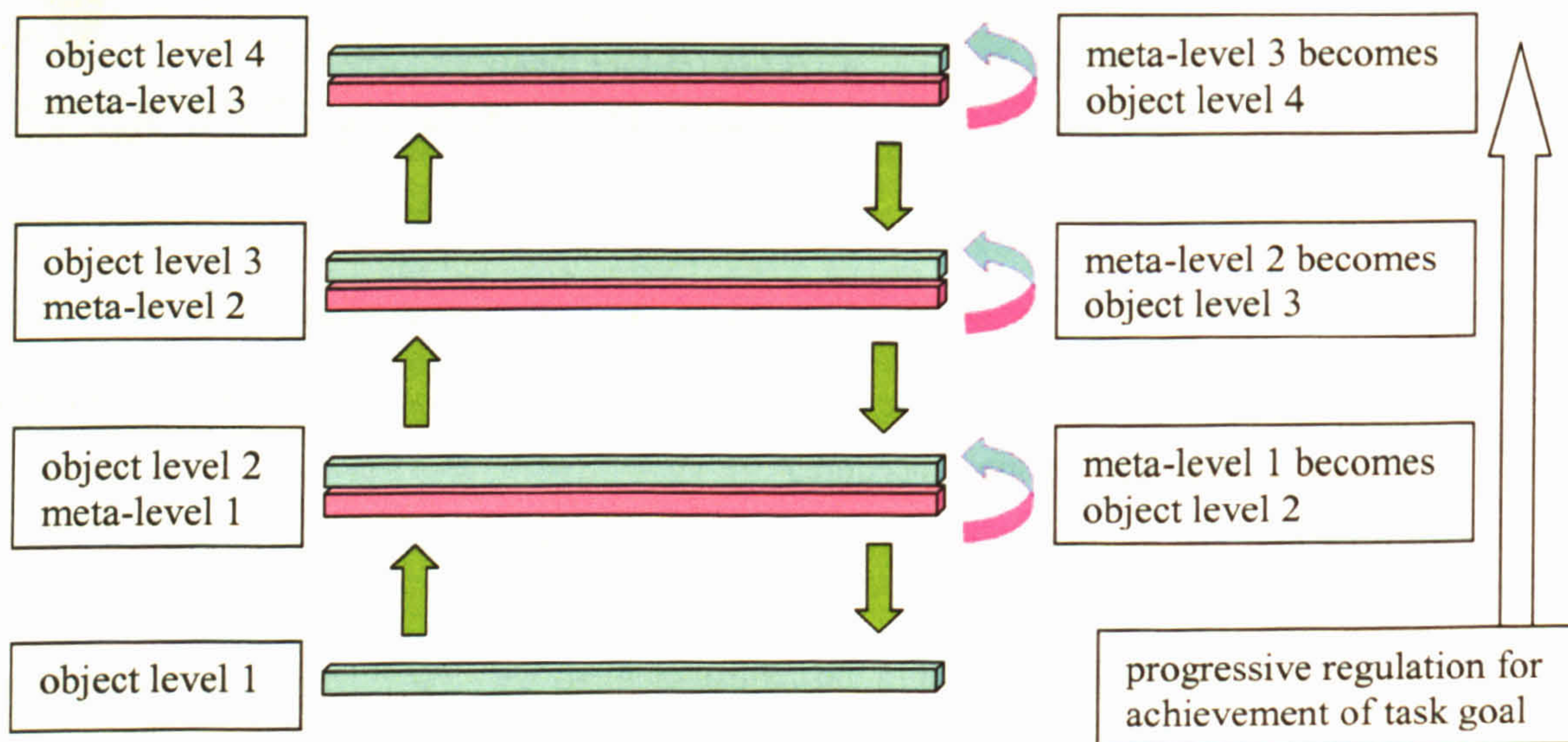
The students were shown that these features were represented in the ideas and suggestions which they had provided earlier when indicating their knowledge about writing (at stage 1), and as part of their reflection on their actions and thinking during a writing activity (at stage 4).

The cyclic nature of the Nelson and Narens model of metacognition was explained. Particular emphasis was given to the way in which, through metacognitive monitoring, the meta-level reflected the object level, and through control actions, how the object level reflected the meta-level.



This occurred because, at the meta-level, comparing the information collected from monitoring with the metacognitive model which the learner already had of the task in hand, led to action at the control stage to improve the cognitive operations at the object level. This cyclic process contributed to a more complete achievement of the task-related goal at the object level. Nelson and Narens (1994) have suggested that this ‘monitoring-comparing-control’ action could be described as promoting the object level to a higher standard of achievement based on the meta-level. This, in turn, gives rise to a continuous (but finite) review procedure where the object level interacts with the meta-level to achieve the standard of that level, making the meta-level a new object level, itself to be subjected to the evaluation (or review) procedure all over again. This resulted in the spiral process illustrated in Figure 7.2.

**Figure 7.2** Progressive development of object levels to meta-levels (after Nelson and Narens, 1994).



The final element of the teaching session focused on the progression from students thinking about their own writing to thinking about teaching writing in the classroom. This was attempted using the elaborated model of metacognition given in Figure 7.1, but changing the context from students’ own writing to children’s writing.



## STAGE 9

This was the final stage for the first academic year of the two-year programme of this study and involved a repeat application of part of the full questionnaire which had been used at the beginning. Its function was to provide information on how the students had progressed during the first year of the study, in relation to their metacognitive awareness. Particular attention was given to the progression from students thinking about their own writing to thinking about their pupils' writing. Both the experimental samples and the control sample were included.

### Data collection

It was decided not to use the full initial data gathering instrument which had been used in Stage 1 as this was planned for re-application at the end of the second year of the study. Instead, only question 7 from the stage 1 questionnaire was used. This was chosen because the original study from which the structure of question 7 had been taken (Devine, Railey and Boshoff, 1993), had found that this question was the single most highly correlated with the others which they had used. It was also the question least reliant on marker judgement, as it required students to select terms from a list in relation to their importance for writing. This format enabled a more objective comparison to be made between students' metacognitive awareness in stage 1 and stage 9.

The question was

**“Select from the 12 items in the list below, the six which you feel at the moment, to be the most important for writing in the two contexts given at the top of each column**

GRAMMAR WORDS & EXPRESSIONS REFLECTING SPELLING DISCUSSION

DRAFTING CONTENT AUDIENCE SEQUENCE NEATNESS PLANNING IDEAS

**For me personally. For children I will be teaching.”**



## Data analysis

The analysis of responses was carried out on only those students in each sample who completed this question at both stage 1 and stage 9 (114 in total). The drop in numbers was as follows

Sample A: stage 1 N = 54; stage 9 N = 41

Sample B: stage 1 N = 36; stage 9 N = 33

Sample C: stage 1 N = 76; stage 9 N = 40

Part of the explanation for this fall in numbers is the number of students who fail to finish their course who mainly will cease their studies by the end of their first year (sample A and C in this study). The summary of responses is given in Table 7.1.

**Table 7.1** Summary of responses for Question 7 at stage 1 and stage 9

<i>For me personally</i>						
	<i>sample A (n = 41)</i>		<i>sample B (n = 33)</i>		<i>sample C (n = 40)</i>	
<i>Terms selected</i>	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 1</i>	<i>Stage 9</i>
spelling	17	12	11	14	9	9
grammar	22	26	18	20	18	16
neatness	10	2	3	3	7	1
words/expressions	12	18	18	13	11	7
ideas	15	18	14	12	17	14
content	33	35	24	28	24	26
reflecting	24	27	21	23	12	20
drafting	26	19	16	10	16	14
planning	30	33	21	25	26	26
discussing	9	13	7	8	8	7
audience	16	30	17	17	6	5
sequence	12	11	9	15	12	17
<i>For children I will be teaching</i>						
	<i>sample A (n = 41)</i>		<i>sample B (n = 33)</i>		<i>sample C (n = 40)</i>	
<i>Terms selected</i>	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 1</i>	<i>Stage 9</i>
spelling	27	31	28	17	19	19
grammar	22	27	22	19	14	20
neatness	18	15	13	24	6	11
words/expressions	33	24	18	19	25	22
ideas	30	32	21	23	19	22
content	14	20	18	18	20	12
reflecting	8	8	6	16	13	4
drafting	3	14	5	11	1	7
planning	16	24	11	24	11	18
discussing	23	22	17	11	19	11
audience	3	4	11	15	5	2
sequence	24	25	14	7	14	13



The statistical analysis of the relevant data when collected at stage 1 (based on chi-square) did not appear to reveal much about the metacognitive model of writing held by the students and therefore that form of analysis was not undertaken when the data were re-collected at stage 9. It was felt that the rank order of the items chosen was more helpful in showing differences in what might have been an indication of the students' metacognitive model. These are listed for each quartile and given in Table 7.2, along with an indication of the terms which have shifted their position by more than a single quartile between stage 1 and stage 9.

**Table 7.2** Comparison of quartile distributions for responses to question 7 at stage 1 and stage 9

<i>Samples A and C (combined)</i>				
	<i>For students themselves</i>		<i>For children they will teach.</i>	
	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 1</i>	<i>Stage 9</i>
First quartile	content planning drafting	content planning reflecting	words/expressions ideas spelling	ideas spelling grammar
Second quartile	grammar reflecting ideas	grammar <b>audience</b> drafting	discussing sequence grammar	words/expressions planning sequence
Third quartile	spelling sequence words/expressions	ideas sequence words/expressions	content planning neatness	discussing content neatness
Fourth quartile	<b>audience</b> discussing neatness	spelling discussing neatness	reflecting audience drafting	drafting reflecting audience
<i>Sample B</i>				
	<i>For students themselves</i>		<i>For children they will teach</i>	
	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 1</i>	<i>Stage 9</i>
First quartile	content planning reflecting	content planning reflecting	<b>spelling</b> grammar ideas	<b>planning</b> <b>neatness</b> ideas
Second quartile	grammar words/expressions audience	grammar audience <b>sequence</b>	content words/expressions <b>discussing</b>	grammar words/expressions content
Third quartile	drafting ideas spelling	spelling words/expressions ideas	sequence <b>neatness</b> <b>planning</b>	<b>spelling</b> reflecting audience
Fourth quartile	<b>sequence</b> discussing neatness	Drafting discussing neatness	audience drafting reflecting	drafting <b>discussing</b> sequence

This method of analysis was also used at stage 1. In the columns relating to students selecting for themselves, the responses at stage 1 and stage 9 indicated a large measure of similarity in all the quartiles across the two stages. There were only two terms reflecting a change of more than one



quartile between the two stages (highlighted in Table 7.2). For the experimental samples, “audience” had become substantially more important by stage 9 and for the control sample, “sequence” had changed similarly. As these changes occurred in only a single item for each group (experimental and control samples) it was concluded that the students had shown relatively minimal changes in their metacognitive model of themselves as writers, between stages 1 and 9.

The terms which the students chose for their pupils were substantially different from those chosen for themselves as writers. Further, there was substantially less similarity between the two samples, experimental and control, and over the two stages. Of particular note was that the experimental samples showed no substantial changes in the importance of the terms between stages 1 and 9, but the control sample showed four such changes. For this sample, “planning “ and “neatness” had increased substantially in importance, whereas “spelling” and “discussing” had substantially decreased.

A possible explanation of the different patterns indicated by the experimental and control samples might lie in their experience in the classroom. The experimental samples were in their first year of the BEd course and their classroom experience by stage 9 was still limited, in terms of planning writing lessons and in teaching writing to children. Their metacognitive views of writing in the classroom might therefore be expected not to have changed much since their entry to the course. The control group were in the second year of the BEd course and by stage 9 would have had notably more experience of planning and teaching writing, both in conjunction with class teachers and by themselves. Their views of the importance of key elements of writing (their metacognitive awareness) might have been strongly influenced by that experience. Therefore it was possible that a change in metacognitive awareness, for the control sample, might have resulted from the experience of providing teacher-supported writing instruction to children in the classroom.

The observed difference between responses by students relating to themselves and to pupils might also have indicated an underlying awareness of the difference between novice and expert writers and this was explored this further through a factor analysis of their responses (Table 7.3).



**Table 7.3** Factors identified from factor analysis of question 7 responses at stages 1 and 9

<i>sample A and sample C (taken together)</i>			<i>For students themselves</i>		
<i>Stage 1</i>			<i>Stage 9</i>		
<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>	<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>
1	13.939	grammar spelling	1	16.058	spelling neatness
2	13.607	audience drafting	2	15.136	discussion reflecting
3	12.937	reflecting	3	13.210	planning
4	12.098	planning content	4	12.121	audience content
5	11.274	sequence	5	9.797	drafting
<i>sample A and sample C (taken together)</i>			<i>For the children they will teach</i>		
<i>Stage 1</i>			<i>Stage 9</i>		
<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>	<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>
1	16.226	audience	1	18.887	ideas reflecting
2	12.422	ideas reflecting	2	15.895	neatness
3	11.292	content	3	12.583	discussion
4	10.817	words/expressions planning	4	11.304	audience
<i>sample B</i>			<i>For students themselves</i>		
<i>Stage 1</i>			<i>Stage 9</i>		
<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>	<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>
1	17.181	grammar reflecting	1	21.380	words/expressions reflecting ideas
2	15.935	words/expressions neatness	2	15.458	discussion neatness
3	14.411	content planning	3	13.256	content
4	12.296	reflecting audience	4	10.874	neatness
<i>sample B</i>			<i>For the children they will teach</i>		
<i>Stage 1</i>			<i>Stage 9</i>		
<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>	<i>Factor</i>	<i>% age variance</i>	<i>Terms with loadings of &gt; +0.5</i>
1	15.755	ideas	1	16.865	neatness planning
2	15.189	spelling neatness	2	15.072	spelling
3	13.100	drafting	3	12.730	ideas
4	12.212	discussion	4	12.328	sequence
5	10.090	content	5	12.313	grammar discussion

Extraction method: Principal Component Analysis  
Rotation method: Varimax with Kaiser Normalisation



The results from the factor analysis indicated some trends which confirmed the analysis of the quartile distributions. For example, with the experimental samples, two of the four factors identified for the children (“audience” and “ideas and reflecting”) were common to both stage 1 and stage 9 suggesting a stable perception of children as writers. This was also the finding from the analysis of the quartile distributions given in Table 7.2 where there were found to be no substantial changes between the two stages.

For the experimental samples’ views on themselves as writers, the factor analysis indicated no common factors between stages 1 and 9. To some extent this supported the change which had been noted in the quartile distributions, suggesting a possible absence of consistency in the students’ metacognitive view. However the factors found at the two stages contained largely the same six terms and this would appear to suggest that the metacognitive model of writing which the experimental group held about themselves as writers was moderately consistent, but less stable than that held for their pupils.

With the control sample, the position is less clear. For children in the classroom, there is a single factor which appears at both stages, indicating a small measure of consistency in the student’ views, but this is contradicted by the substantial variation in the quartile distributions indicated above. Perhaps the change in metacognitive awareness suggested by the quartile distributions is not as well established as suggested above.

The factor analysis of the responses from the control sample on themselves as writers is rather similar to that shown for the experimental samples. There were no common factors between the two stages and the terms appearing in the factors found, included nine out of the twelve terms available. This finding was in opposition to that from the quartile distributions and may indicate a less stable metacognitive model of writing for the students themselves.

A summary of the findings from the quartile distributions and from the factor analyses is given in Table 7.4



**Table 7.4** Changes from stage 1 to stage 9 indicated by analyses of quartile distributions and of factor analysis for all samples

<b>Samples A and C</b>		
	<i>Differences between stage 1 and stage 9 in inter-quartile distribution</i>	<i>Differences between findings at stage 1 and stage 9 in factor analysis</i>
<i>For students themselves</i>	Only one item moved substantially, suggesting relatively stable metacognitive model	No common factors
<i>For their pupils</i>	No items moved substantially, suggesting metacognitive model is unchanged	Two factors common to both stages suggesting metacognitive model is largely unchanged
<b>Sample B</b>		
	<i>Differences between stage 1 and stage 9 in inter-quartile distribution</i>	<i>Differences between findings at stage 1 and stage 9 in factor analysis</i>
<i>For students themselves</i>	Only one item moved substantially, suggesting relatively stable metacognitive model	No common factors
<i>For their pupils</i>	Four items moved substantially suggesting little stability to the metacognitive model	One factor common to both stages suggesting some stability to the metacognitive model
<b>All samples</b>		
<i>For students themselves</i>	Items chosen were consistent with a knowledge transformation approach to writing (expert writers)	
<i>For their pupils</i>	Items chosen were consistent with a knowledge transmission approach to writing (novice writers)	

### Discussion and conclusions from stages 8 and 9

The teaching session at stage 8 was certainly difficult for students in the first year of their course and the concepts introduced were complex and not easy to assimilate in a single (extended) session. It had been decided that the term “metacognition” would not be introduced at the beginning of the study in preference to the term “thinking about ...”. It was judged that this was a correct decision and that it might even have been preferable to postpone using “metacognition” until a later session than stage 8, but as the model of “thinking about ...” which was the central feature of the teaching in stage 8 was referred to in the literature as a model of metacognition, it was felt necessary to use that term.



It was also demanding on the students to ask them to comprehend a model of metacognition relatively soon after the introduction of a *cognitive* model of writing at stage 5 only a few months earlier. The development of the students' more complete comprehension, from an understanding of the cognitive elements of the writing process to an awareness of their metacognitive knowledge about writing, was unlikely to have been achieved easily or quickly. The relationship between students' cognitive awareness and their metacognitive awareness, and how they may progress from one to the other, were not covered at any depth in this study and this appears to be an area worthy of further research.

The students were encouraged to read further about the models of metacognition to which they had been introduced but the likelihood of this having been done by other than the occasional student was judged to be low. Also, the success of the teaching in stage 8 was not easy to assess at the time. It was expected that as the teaching about metacognition proceeded into the second year of the BEd course, the information given might become more meaningful to the students as they progressed in their overall understanding of metacognition in the teaching of writing.

The link between stages 8 and 9 was explained to the students in terms of their developing understanding of the process of learning about learning and thinking about thinking. It was probably clearer to the students that the completion of the question asked at stage 9 was about their awareness of thinking about thinking (in the context of writing), than it had been in the stage 1 activity. Interestingly, however, there were many areas where their choice of terms was relatively consistent, perhaps suggesting a measure of stability in their metacognitive models.

It was possible that the differences found in the analysis of the findings at stage 9 might have indicated some metacognitive awareness by the students of the different models of writing which related to themselves as expert writers and to their pupils as novice writers. The widely reported views of Bereiter and Scardamalia (1987) about novice and expert writers suggest that the major difference between these types of writer lies in the skills employed in using information in composing a writing task. The novice writer will use a basic knowledge-telling process of one item



after another as each is recalled from memory, whereas the expert writer will transform the knowledge in a way that involves some processing or restructuring before it is embedded in the written composition.

The preparation and planning which Bereiter and Scardamalia suggested that novice writers undertake, is at the same (superficial) level as the actual carrying out of the writing, rather than at a more abstract level which is typical of the expert writer's planning. Thus the writing of novices was characterised as being descriptive while that of expert writers was more explanatory.

There was evidence from stage 9 which reflected these two views of a writer. From the students' responses (in Table 7.2), the terms which appeared most frequently and were consistently mentioned by both experimental and control samples in the upper quartiles were,

*For students themselves*                      "content", "planning", and "reflecting".

*For children they will teach*            "ideas", "spelling," "grammar" and "words/expressions"

There seemed to be a strong relationship between the terms most frequently selected for the students thinking about themselves as writers and the features of expert writers suggested by Bereiter and Scardamalia. These features are associated with the *planning* process of *thinking* about the *content* (and structure) of a piece of writing in the preparation for the final composition stage, i.e. knowledge transformation. Similarly, there was a strong relationship between the terms most frequently selected for the students thinking about the writing of children in terms of the specific features of knowledge transmission as used by novice writers. These features include the *ideas* and the *words and expressions* included in the writing product and their presentation with correct *spelling* and *grammar*. There did seem to be some evidence, therefore, that there was an identifiable link between the metacognitive models of writing which students held, and the two approaches of expert and novice writers.

Although during the teaching sessions several references had been made to the progression from thinking about their own writing to thinking about teaching writing in the classroom, particularly at



stage 8, it was not suggested to the students that they might have a different model of each. What was interpreted from the data collected at stage 9 was taken to be a reflection of their personal awareness of the two situations. The pattern of responses between stage 1 and stage 9 therefore seemed to support that there was a reasonably clear difference in the knowledge, perhaps at a conscious level as well as at an unconscious level, which the students had of writing in the two conditions of themselves and their pupils. The teaching up to stage 8 had not explicitly detailed the models of expert and novice writers (this was introduced later, in stage 12) but it was clear that the students already had some awareness of the differences between these two types of writer.

## Summary

Stages 8 and 9 included a teaching session and a data collection session where the focus was on metacognitive awareness. The teaching session presented the theoretical models of metacognition, that proposed by Flavell (1976) relating to metacognitive knowledge and that proposed by Nelson and Narens (1994) concerned with regulation (monitoring and control). The explanation of the models involved using examples of the data collected from students at earlier sessions in order to link the theoretical constructs with the students' own ideas and experiences.

The data collection at stage 9 assessed the students' metacognitive awareness of writing using a question previously given in stage 1 where the responses involved selecting writing-related terms from a given list. This was administered to the experimental samples and to the control sample. Two analyses were carried out, a simple analysis of the rank order of the frequency of choice of the terms and a factor analysis of the choices made.

The results indicated that the metacognitive model of writing which the students held in relation to themselves had not changed much since the start of the study (more consistently so for the experimental samples than for the control sample). There was a similar finding for the experimental samples' metacognitive model relating to children but for the control sample there



were indications that the model might have changed. This could have been due to the greater experience of the control sample in teaching writing in the classroom.

The evidence suggested that there were differences between metacognitive models of writing held by the students in relation to their own writing and that of their pupils, and that these matched well with the description offered by Bereiter and Scardamalia (1987) with regard to expert writers and novice writers respectively. The success of the data measuring instruments in identifying a metacognitive model of writing was also taken to be significant.

Opportunities for further research were identified in examining in greater depth the relationship between students' cognitive knowledge and their metacognitive awareness in relation to writing.







## **Chapter 8**

### **Stages 10 and 11 Thinking about teaching writing**

#### **Function**

Stages 10 and 11 were implemented at the beginning of the second year of the BEd course for the experimental samples and comprised a teaching stage and a data collection stage. Both stages attempted to draw links with the ground covered earlier during the first year of the study and to present a more comprehensive view to the students of the area covered during the whole two-year study. This was intended to present a more complete view of the planned two years' work on metacognition and writing. The data collection stage gathered information about students' perceptions of their pupils' metacognitive awareness of writing.

#### **STAGE 10**

This teaching session summarised some of the earlier material relating to students' thinking about themselves as writers and emphasised the shift from students' own writing to teaching writing in



the classroom. Much of the earlier work was therefore re-interpreted in the context of teaching writing to children.

### **Structure and content of the teaching**

Following a brief summary of some of the earlier teaching and data collection stages, the students acknowledged that they had learned something about themselves as writers in the first year of the study. During a short discussion, these gains were highlighted to focus on students' actions while engaged in their own writing with an emphasis on understanding the writing process. The difference between cognitive knowledge of writing and metacognitive knowledge of writing was emphasised with particular reference to the models of metacognition proposed by Flavell (1976) and by Nelson and Narens (1990, 1994).

To highlight the shift of focus from thinking metacognitively about the students' own writing to thinking metacognitively about teaching writing, metacognitive knowledge was dealt with separately from self-regulation. With regard to metacognitive knowledge, two aspects were specifically examined; knowledge about the writing process, and knowledge about the content of writing. It was shown that these two areas of metacognitive knowledge were also present in the Hayes (1996) model of writing which been introduced to the students at an earlier stage and which was the basis of the Writer Profile.

Special mention was made of the procedural elements of writing, namely the *rules* of writing and the *cognitive processes* of writing. In teaching writing in the classroom, the rules of writing were normally addressed by teachers who had a structure for their teaching either based on their own experience or on a 'writing scheme' used in the school, to ensure that the principle rules and procedures were methodically taught. Teaching the cognitive processes of writing, on the other hand, was often a much less routine activity and the students were asked to pay particular attention to how these processes of writing were introduced in the classroom, during other teaching on the



BEd course and while on teaching placement in schools. To help the students identify the cognitive processes in writing, a short ‘brainstorming’ session produced the following list of suggestions:

- getting ideas
- organising the content
- choosing words and expressions
- making changes
- making a plan for writing
- checking the task
- keeping on target

Two further suggestions were made to the students about important elements relating to cognitive action during writing; attention (especially selective attention) and short-term memory. The importance of attention was described as the limitation of the attentive facility, for adults as well as children, to focus on more than a single major task at one time. Kellogg (1994) refers to this as the “attentional funnel” (p 162) and has indicated that its influence is to make a writer concentrate on a single process when there are multiple processes requiring attention. This, Kellogg claimed, has the effect of restricting a writer to *thinking* about writing or *undertaking* writing, but not both; or thinking about the *content* of writing or getting the writing *process* correct, but not both.

The influence of Short-Term Memory (STM) had been only very briefly considered when the profile of a writer was developed at stage 5. At that time the students felt very uncertain about its inclusion into the writer profile because they were not able to identify relevant comments about themselves as writers, in the context of STM. It was considered important, therefore, to reinforce the place of Short Term Memory in the Hayes (1996) model of writing and to establish its contribution to teaching writing in the classroom. In support of this teaching point, a brief introduction was given about the role of STM in the cognitive activity which took place during writing, with the advice that this would be examined in much greater detail at a later teaching session (stage 12).



Monitoring and control aspects of a metacognitive approach to writing were re-examined using the Nelson and Narens (1994) model of metacognition. It was shown that monitoring and control might function in teaching writing in the classroom as self-regulatory activities which the children might be taught to follow as they produced writing drafts. The Nelson and Narens model provided a framework in which these activities could be encouraged in children, although for younger children in the earlier stages of writing development, questions relating to monitoring would have to be simplified and assistance might have to be given in finding the answers to them.

This focus on self-regulation during writing was expected to make considerable demands on the students who were still relatively inexperienced in teaching skills. Consequently, although the teaching within stage 10 covered some of the relevant ground, the task of collecting data specifically about self-regulation was left until a later stage (stage 14). As an alternative, to help with the change in focus from thinking about themselves as writers to thinking about teaching writing in the classroom, students were asked to collect information, during their next school placement, on what they considered might be a writer profile of their pupils. This matched well the focus from the Language Studies Department on teaching writing as a specific requirement of students during the school placement in question. The adaptation of the Hayes model of writing was again used to produce a writer profile.

## **STAGE 11**

This data collection stage required the students to collect information during their first school placement in year 2 of their course, to complete a writer profile of their pupils (see appendix 4). The students were encouraged to select a fairly typical child or a group of children on which to make their observations. It was anticipated that the range of such individuals or groups would be fairly wide and the resultant writer profiles might be representative of a substantial cross-section of children in the local Primary schools.



## Data collection

As with the instructions for students' completion of personal writer profile, a description of the five categories of the profile was provided. The students were asked to record relevant events in the classroom which contributed to their interpretation of the significance or importance of each category for the pupil or pupils selected. To help the students, some examples of possible observations were supplied as indicated in the following paragraphs.

The *social environment* referred to the importance of writing as a social activity wherein children's writing standards might be influenced by others in the writing environment (teachers, parents, friends, 'important people we write to', etc.). Shared or collaborative writing was generally approved and encouraged and the outcome was dependent on the nature of both the collaborative group and the individuals within it. Writing was for others to read and was carried out differently for different intended readers.

Examples:

"When involved in writing a thank you letter, this group of more able children seemed to imagine what the reader would think when reading it."

"The group shared ideas very successfully to make the final writing of each pupil much more extensive."

"One member of the group made very little contribution to the discussion about the acrostic poem and was not really able to make up his own."

*Motivation and affect* included the writer's feelings about writing, including the drive to carry out writing tasks, as well as the unwillingness of children to engage in writing. The 'feel good factor' in writing was part of the overall value of writing as it might be promoted within the development of personal achievement of any pupil in the school. Having children's writing on display for others (such as parents and school visitors) to see, was one way of promoting this.



Examples:

“Getting started was hard for them all.”

“The girl studied was a most prolific writer and clearly got a lot of pleasure from her writing.”

“I found a noticeable difference when I put the children’s names on their work and displayed it in the corridor, especially when the head teacher came in and said she had been reading it all and thought they were all really good – what a boost!”

The *physical environment* included what was in front of the reader as well as in the surrounding vicinity. What had just been written should help writers to decide what to write next. The medium of pencil and paper or a computer also influenced the writing process, some aspects of one or the other being easier for different writers under differing conditions. The physical environment might also have included the surroundings existing during the writing task, notably noise, space, interruptions, etc.

Examples:

“Most of the group just did not look back at what they had already written.”

“The pupil I studied used the dictionary and reference books a great deal.”

“The older children just wanted to go away to a quiet area of the classroom and get on with it.”

*Cognitive processes* included the parts of writing that involved all aspects of thinking, such as planning, deciding, structuring and making internal representations of all the resources to be used for producing the final writing output. It therefore involved speaking, listening and reading as they contributed to the writer’s own thoughts in the process of deciding how to create a piece of writing. These internal representations involved the identification of difficulties, of working out meanings, and arriving at understandings.

Examples:

“This child is still not very good at planning a structure.”

“I have been talking about ‘thinking about your writing’ with some children and they seem to be very willing to tell me what they think – I didn’t expect that!”



*Long-Term Memory* included all the experiences which were the personal background to an individual's involvement in writing. Some of this was clear and easily recalled, whereas other material may still have been confused and difficult to recall or use in new writing. Also in long-term memory were all the rules and conventions of writing which had been taught or had been identified through reading the writing of others.

Examples:

"This particular pupil has a really extensive vocabulary and lots of very good ideas which have been used in new writing."

"The children are very good at helping each other to remember things they need to use for writing reports."

"The children in this group have difficulty in remembering all they already know and this makes their writing so much harder."

A summary of the profiles produced by the students was returned to them at a later stage in the study when a comparison between the student writer profile and the children's writer profile was presented.

### **Data analysis**

As with the completion of the personal writer profile, both experimental samples took a long time to submit the writer profile for their pupils. It again involved several reminders and number finally submitted was 42 from sample A students and 44 from sample C students. These figures were very similar to the numbers from each sample that had responded at stage 6 and a closer examination revealed that they were largely the same students.

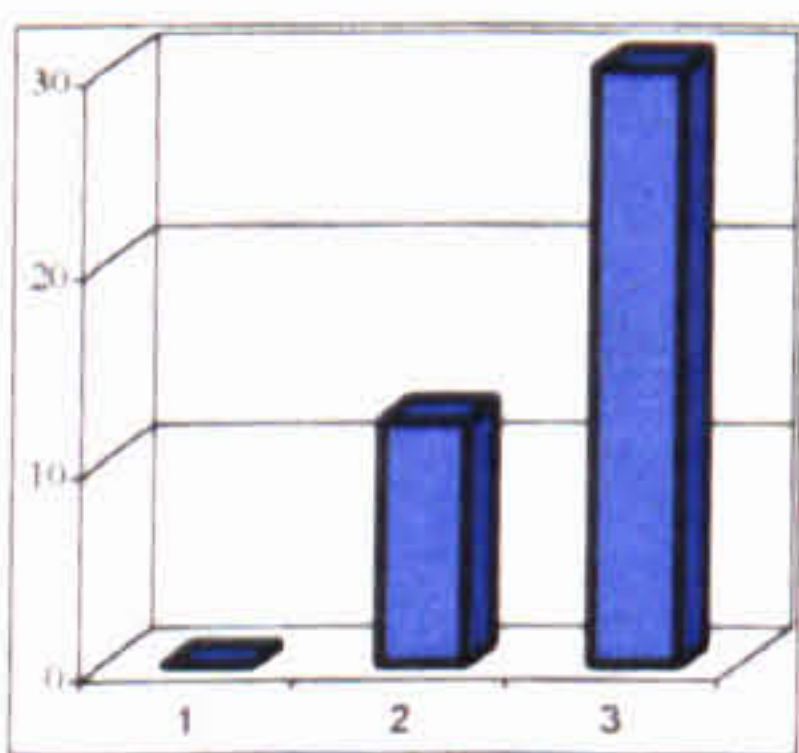
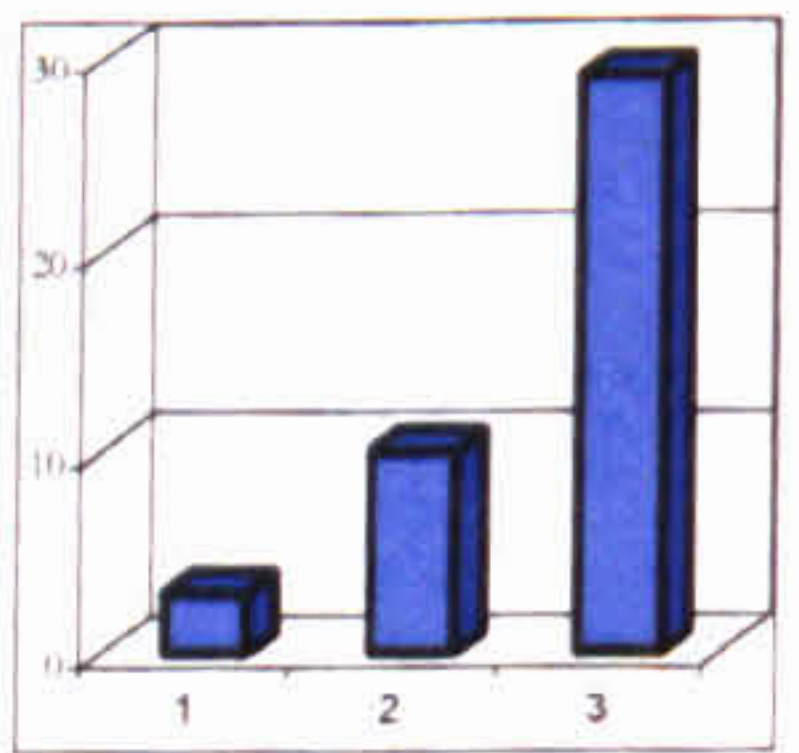
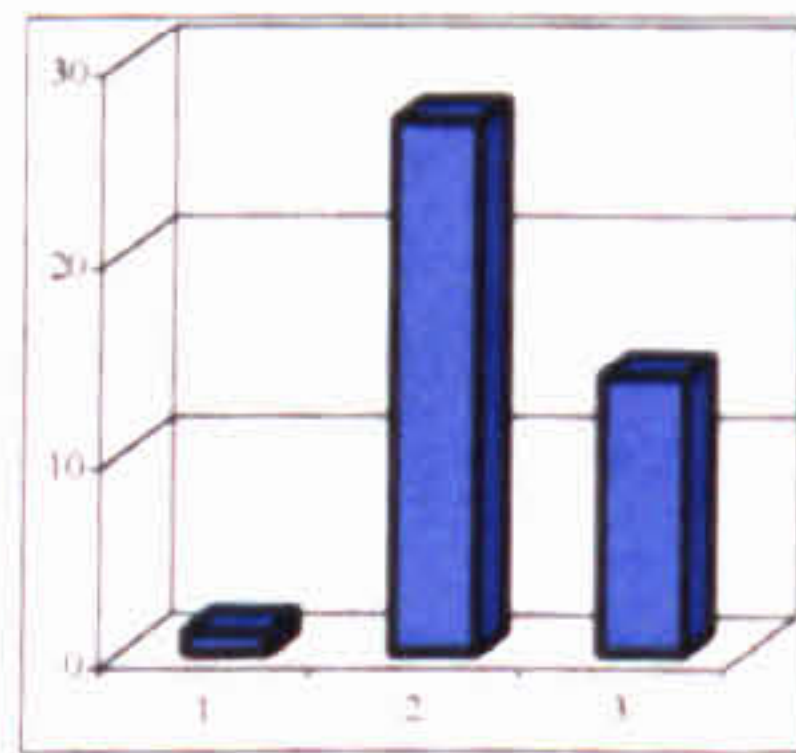
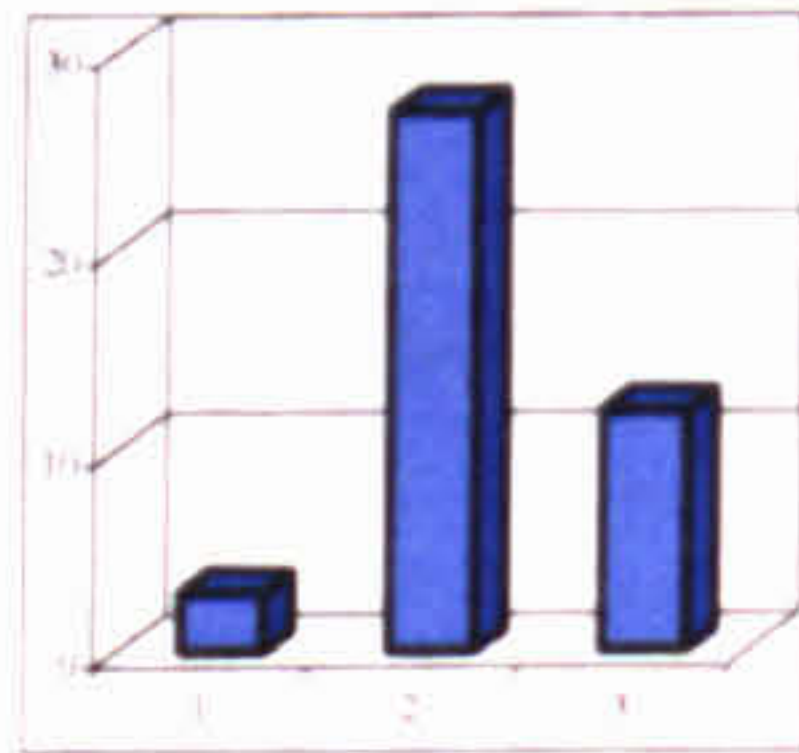
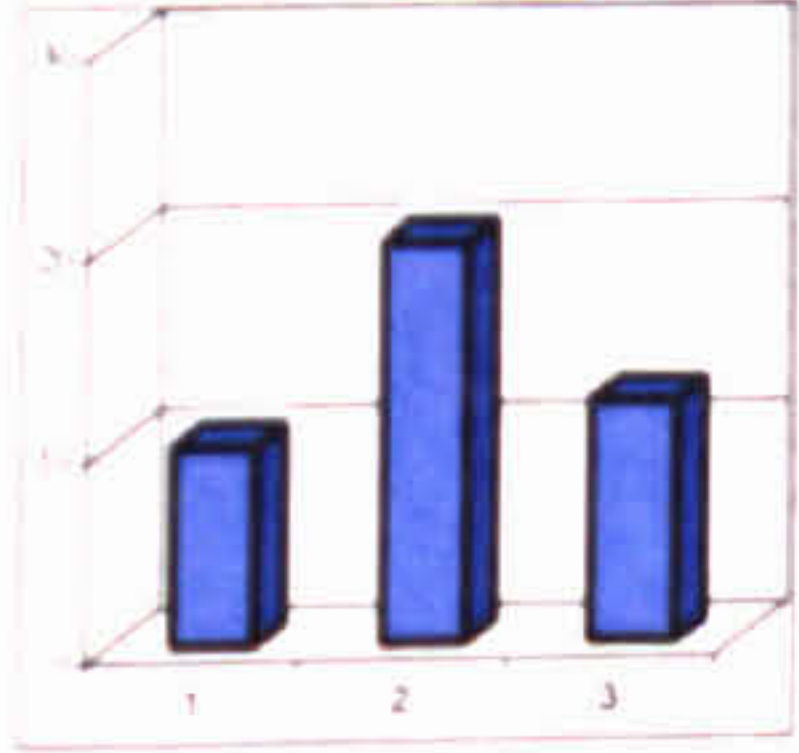
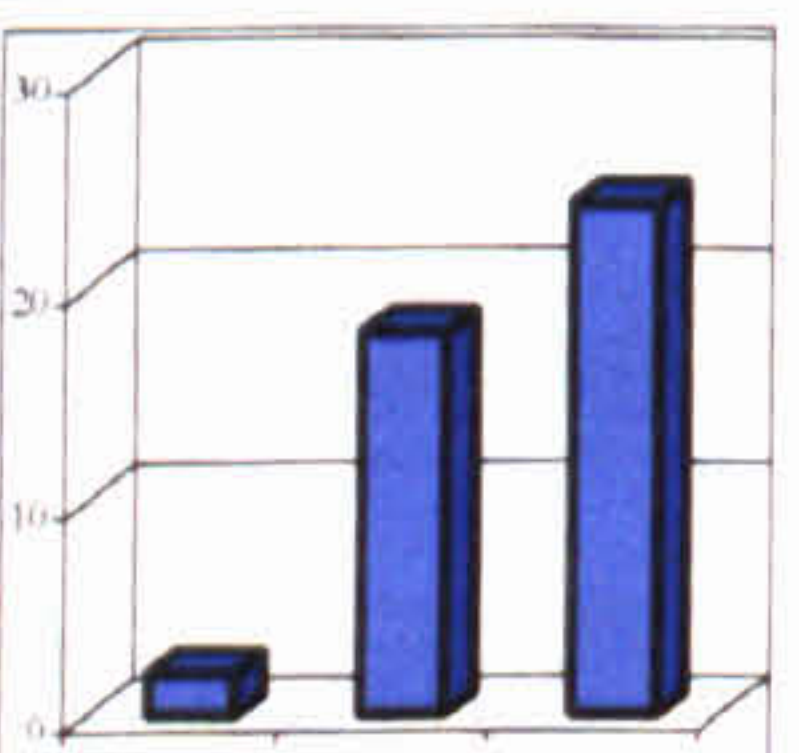
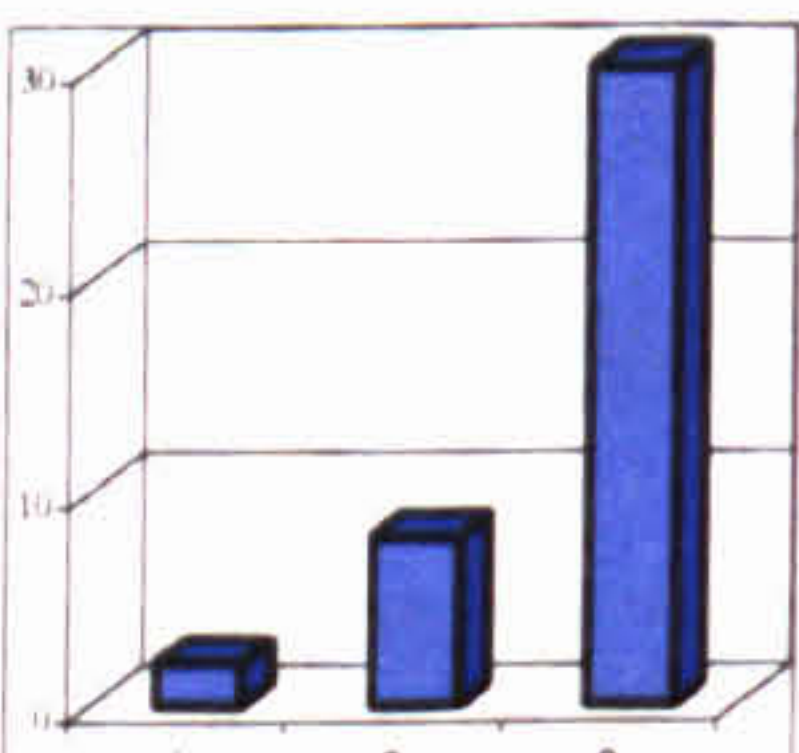
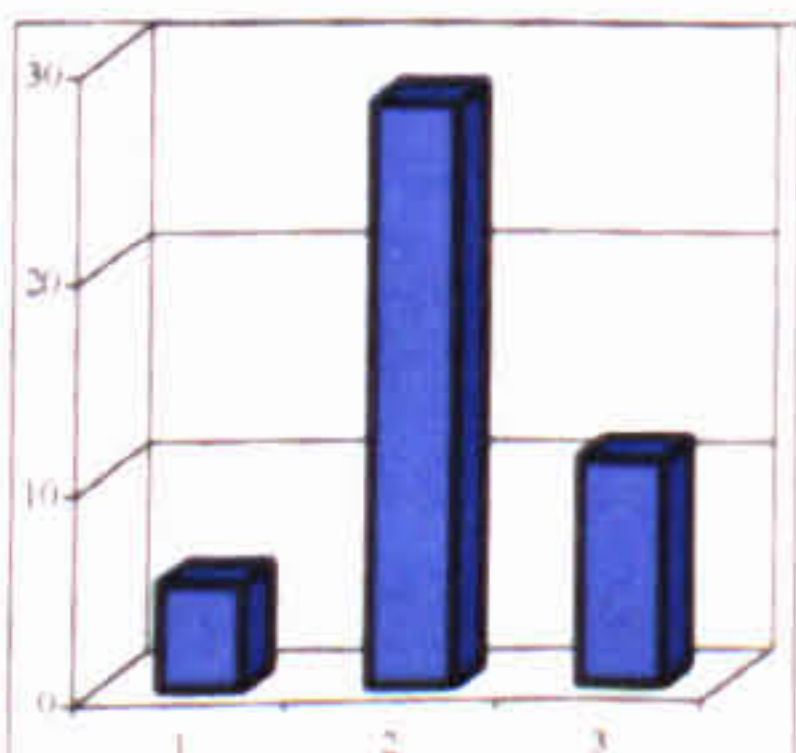
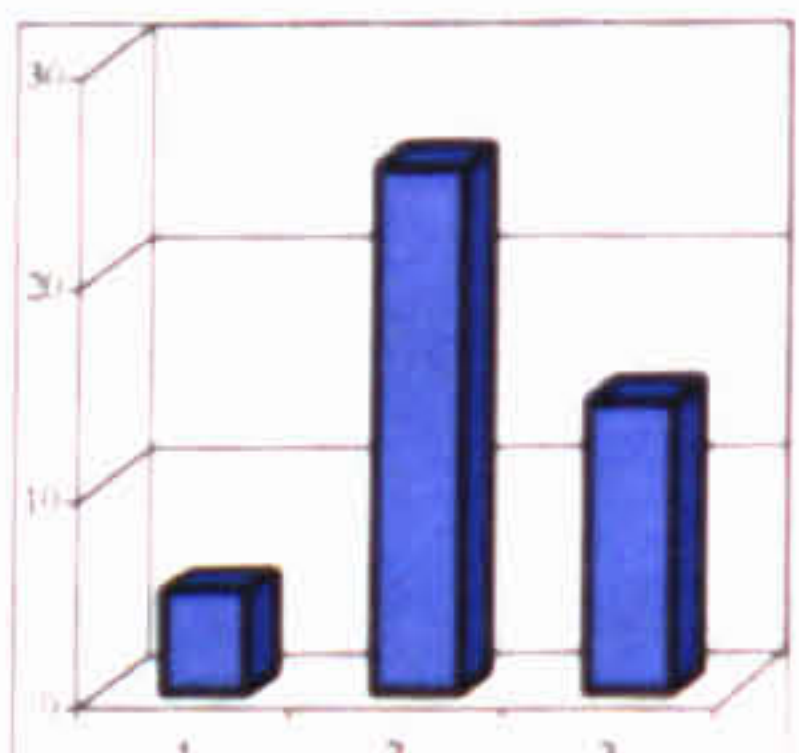
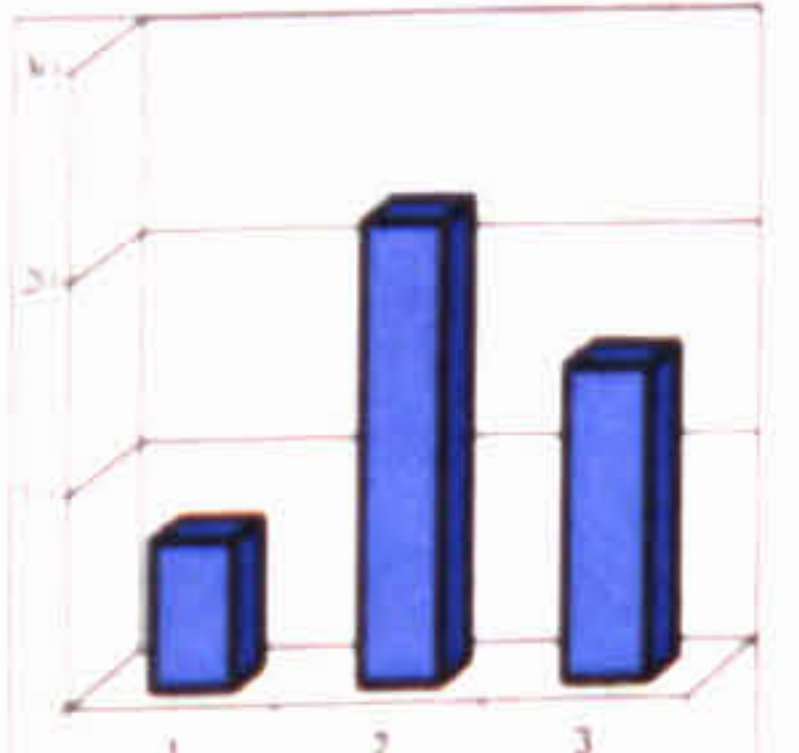
The approach used to analyse the information collected for the students' personal writer profiles was also used with the pupils' writer profiles. Each profile comprised 5 categories with



appropriate descriptions of the children's writing activities as well as a value rating of 1 to 3 indicating the students' perceptions of the significance or importance of each, for the pupils or groups of pupils.

The mean values and distributions of the ratings, for each of the categories of the writer profile for sample A and sample C, are given in Table 8.1. It was clear that the two samples had produced very similar pupils' writer profiles despite the wide range of classrooms which the students had been in and the gap of one year between the two occasions when the students had collected the information for the profiles. The evidence suggested that the students had viewed the categories of the children's writer profile with notable consistency across many different classroom environments. To examine this more closely, the comments which accompanied the profile ratings were scrutinised.

**Table 8.1** Mean values and distribution of ratings given for each category of children's writer profile for experimental samples

The Social Environment	Motivation /Affect	The Physical Environment	Cognitive Processes	Long Term Memory
<b>Sample A</b>				
				
Mean = 2.71	Mean = 2.62	Mean = 2.31	Mean = 2.21	Mean = 2.05
<b>Sample C</b>				
				
Mean = 2.50	Mean = 2.73	Mean = 2.14	Mean = 2.21	Mean = 2.18

In *the social environment* the focus of the comments was the same whatever rating had been given and in both samples the suggestion was that the key feature of the social environment of writing for their pupils was discussion. Of those indicating discussion, this was predominantly at the level of small groups (70% of respondents) though class discussion also figured (around 30% of



respondents). There was a small minority (less than 10% of respondents) who indicated that discussion was not part of writing instruction in the classroom. The majority of the value ratings were 3, with lower ratings usually linked with events which were less favourable, such as,

*“The same one or two children kept volunteering suggestions.” (value 2).*

*“Discuss their ideas in small groups ...drawback was the completed pieces of work would all be similar with little individuality.” (value 2).*

For *motivation and affect*, the comments covered a wide variety of writing contexts and often indicated differences between more capable and older children compared with younger and less able pupils. It was clear that younger children and less able pupils were more difficult to motivate. The context for writing was also frequently mentioned as being a significant factor in influencing motivation, with topics which interested the children having the most influence. Of all the comments, a high proportion (almost 70%) indicated that pupils were positively motivated towards writing, with a much smaller proportion (around 20%) recording poor motivation. The students recognised this to be a complex component of the writer profile and possibly the one with the most contributing factors. The students rated this as the highest of the components and therefore the most significant for writing.

In most of the cases where low motivation was indicated, this was reported as relating to children who were less able or lacked confidence in writing, or to specific contexts which children found unmotivating. The students seemed to realise that an important role of the teacher was finding ways to motivate the children, such as,

*“I don’t think the pupils knew what the purpose of their writing was.” (value 2).*

*“... children enjoy writing when the context given to them is appropriate.” (value 3).*

Within *the physical environment*, the students had identified in their own writer profile the importance of checking their understanding of the task by looking back at the wording of the instructions given. Rather fewer had identified the arrangements within the workspace as being particularly important. In the context of the children’s writer profile these became reversed with



the workspace features becoming most frequently mentioned and in particular, distraction due to noise was the most obvious concern,

*"... a very noisy classroom, which (was) reflected in the amount and quality of work." (value 3).*

Also mentioned as part of the physical environment was the use of writing aids such as dictionaries or examples of completed writing, with as many as 15% of the students identifying such supports as making a significant contribution to their pupils' writing environment,

*"The classroom was full of examples of work from their writing scheme and ... this was a stimulus for their writing." (value 2).*

The principal elements of the *cognitive processes* identified were planning (mentioned by 77% of the respondents), getting and organising ideas (45% of respondents), drafting or redrafting for the improvement of the original writing (22% of respondents), discussing content in groups or at class level (19% of respondents), and actively looking at sentence or paragraph construction (16% of respondents). A large number of the students also reported that their children did not like planning or drafting and seemed to see little value in such activities. This was more obviously the case with the poorer children but was also true more generally.

*"It didn't matter how much I explained that planning would help them they still thought it was a chore." (value 1).*

*"The children often hated planning because it was boring ... they just saw it as extra work". (value 2).*

*"The less able ... when they came to write out their copy of the story, couldn't see the point because they had already done it." (value 2).*

*Long-Term Memory (LTM)* was rated the lowest overall of the categories of the pupil writer profile.

The comments for this category fell into five groups, two of which related to recalling ideas for inclusion in the pupils' writing. One of these groups was at the more general level where LTM was linked with the recall of ideas and experiences familiar to the children (38% of respondents) and the other group indicated that more able children were better at recalling ideas from LTM than less



able children (19% of respondents). Another two groups referred to LTM as the location of information about the rules of writing, with one group related to difficulty in retaining or recalling this information (27% of respondents), with the other group demonstrating the ability to recall it (23% of respondents). The fifth category of responses (10% of the total) suggested that there were some children who could not manage to recall from LTM both ideas for the content of their writing and information about rules of writing and that it was either one or the other. This conflict probably occurs in short-term working memory rather than in long-term memory, but that may have not been immediately apparent to the students.

Where the responses indicated that the pupils had difficulty storing or recalling information about the rules of writing (27%), there were often additional comments relating to poor learning activities which were linked with remembering, such as,

*"I feel that they never listened, therefore had very little idea about previous tasks or instructions."* (value 1).

*"pupils could remember doing the work but didn't necessarily remember how to do it."* (value 2).

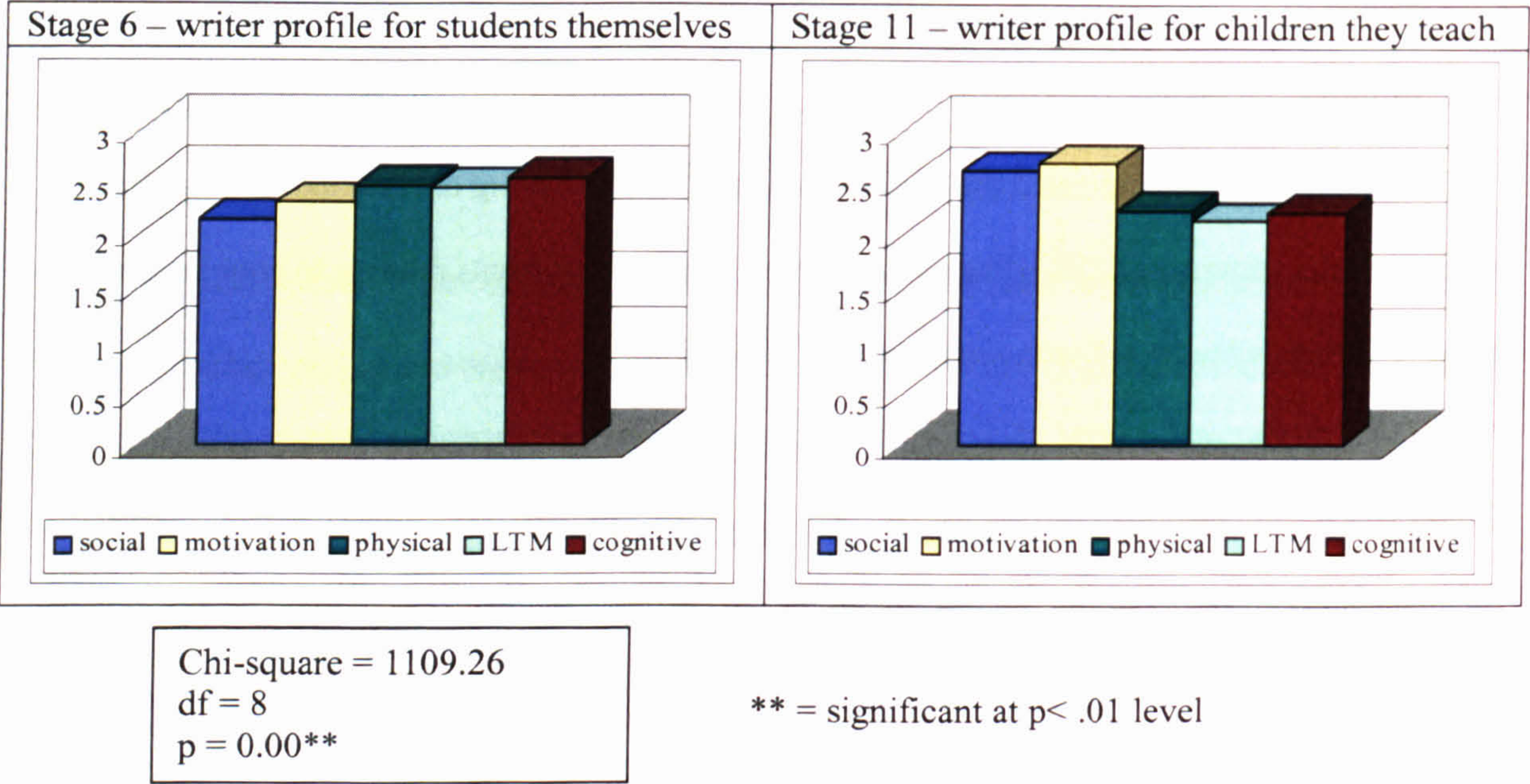
In summary, the data for a children's writer profile indicated that motivation was probably the most important aspect of the profile. The data also showed that; children in the classroom were positively motivated towards writing, the key aspect of the social environment was discussion within the peer group, and the physical writing environment could be very supportive to children's writing in providing writing aids and reminders. The cognitive aspects of writing centred on planning and organising the content for composing written text, although planning seemed to be disliked by many children. Long-term memory was given the lowest value of all the categories and the comments on its function were fairly evenly divided between a repository for content ideas and a store for knowledge about the rules for writing.



Average profile of a writer

An average children’s writer profile was prepared, taking sample A and sample C together, and was compared with the average student writer profile which had been derived at stage 6. These are both given in Table 8.2.

Table 8.2      Average students’ writer profile and average children’s writer profile



There was a statistically significant difference between the two writer profiles. The data suggested that the students saw the social and motivational factors as consistently more important for young writers while cognitive factors and long-term memory, broadly the information processing aspects of writing, were at the highest (most important) level for themselves as writers.

A possible explanation of the observed difference between the two writer profiles might include that the students felt there was less of a demand for children during their writing on the information processing and thinking (cognitive) aspects of writing, compared with similar demands on their own writing. A more detailed explanation of function of short term memory in the writing process and the competing demands on the available ‘space’ for the mental functions associated with text production and of the recall of information for the content of writing, were to be explained at the



following teaching session (stage 12). The indication at this stage, however, was that the students were already aware of this difference between themselves and their pupils.

The social and motivational categories of the writer profile had changed from the less frequently chosen of the categories for the personal profile to those chosen more frequently for the children's profile. During the first year of the Language Studies Department course on writing, the importance of children sharing with their peers (through discussion) during the earlier stages of writing had been emphasised to the students and this had probably accounted for the high value rating of this category in the children's writing profile compared with their personal writer profile. There was a noticeable relationship between the reported views of students sharing with peers during their own writing (and this was also strongly promoted during the Language Studies Department writing course) and teaching writing in the classroom to involve pupils similarly sharing with their peers. Clearly both sharing activities were advocated and both were subsequently observed in the data collection associated with this study. Later evidence indicated that the students held different views about the worth of peer sharing at these two different levels.

The information collected about teaching writing in the classroom and reflected in the children's writing profile, laid greater store by the social aspects of writing rather than the cognitive aspects of writing. From the researcher's familiarity with advice routinely given to teacher education students, this was consistent with the current general thrust of instructional practices for writing as a process of communication rather than the achievement of a 'technically correct' written product. This approach to writing was also consistent with modern views of pupil-pupil and pupil-teacher interactive learning in the classroom, which emphasised the relevance of the social and the motivational aspects of children's writing (HM Inspectors of Schools, 2000).

Discussion with students as they submitted the completed writer profiles indicated that they had had found the task particularly informative in terms of the importance and relevance of their own teaching contribution to children learning about writing.



## Discussion and conclusions from stages 10 and 11

Thinking about teaching writing was the intended unifying link between stages 10 and 11. This was limited by the student experience of teaching writing in the classroom not yet being extensive. In stage 10, the students were shown how to transfer their metacognitive awareness from their own writing to the teaching of writing in the classroom. This was attempted through examining the models of metacognition previously introduced in the context of the students' awareness of themselves as writers. By focussing on the rules of writing and the cognitive processes of writing as they applied to themselves, the students were encouraged to extend the focus of these to the context of teaching the rules and the processes to children.

The students appeared to readily follow this part of the teaching and they were able to identify successfully the cognitive activities involved in teaching writing. They were also able to associate these with the key elements in the Nelson and Narens (1990) model of metacognition. As they did this, they were reminded of the central role of monitoring and control in metacognition and encouraged to view regulation as involving the key stages of the Nelson and Narens model, namely; the currently active stage, the monitoring stage, the metacognitive judgements at the metalevel, and the resulting control actions in the final stage of the metacognitive cycle. The students had limited experience in following this type of thinking and in addition some may have still been struggling with the nature of the metacognitive process. The task of comprehending the concepts of metacognitive awareness and metacognitive skills *for children*, along with the integration of these into a set of interactions as suggested by the Nelson and Narens model of metacognition, was undoubtedly difficult for many of the students.

Teaching the rules of writing and the cognitive process of writing to children in the classroom was associated with the students' preparation for the data collection at stage 11. The students were required to undertake these teaching activities during the school placement where the stage 11 data collection was to take place and therefore the production of a children's writer profile was intended to help the students understand how their pupils learned about the writing process. This led to



some significant conclusions, probably the most relevant of which was in relation to the contribution of the students' teaching to the children's learning. The students saw just how important their own role was and how significant their influence was in helping children to become competent writers.

For some students, the collection of the data for the children's writing profile proved difficult, particularly when they did not appear to grasp the links between collecting the writer profile information and their own part in the teaching of the rules of writing and the cognitive elements of writing. However, for most students, the key findings from the individual profiles served to highlight the areas where their contribution as teachers was likely to be particularly important. That the students had discovered these findings themselves through looking at the pupils' learning, was seen as particularly relevant in helping them to develop a metacognitive approach to thinking about teaching writing. The students discovered the importance of peer group discussion within the social environment of writing, the central role of pupil motivation, the need for the provision of supports for writing within the writing environment and the central role of planning and organising of the content for writing. The awareness of these influences on children as writers was taken to be a valuable indicator of the students having gained relevant insights into teaching writing.

From the analysis of the data in stage 11, and particularly the comparison between the two writer profiles (students' own and that of their pupils), there was an important outcome regarding how the students appeared to have interpreted their metacognitive understanding of their own writing as it contributed to adopting a metacognitive approach in teaching writing. The key finding was that the students saw pupils as different from themselves as writers. The analysis of the differences between the two profiles produced a more detailed comparison of the two perceptions. Perhaps the most obvious outcome of this analysis was the relative importance of the social and the cognitive aspects of the writer profile. Until the students were asked later to explain these differences, it was not clear how much that difference was based on a metacognitive understanding of the writing process or how much the students were attempting to use their metacognitive understanding of their own writing in the teaching of writing in the classroom.



Support for the use of a profile approach to teaching and learning in writing had been suggested by Harris and Graham (1992) when they argued that the use of a multi-component approach was particularly appropriate. They indicated that such an approach should specifically address “affective, behavioural, cognitive, and social and ecological processes of change” (p 284), aspects of writing. These were similar to the writer profile elements of motivational, physical, cognitive and social aspects of writing used in the present study.

When the students were (later) shown the two writer profiles they were able to offer some explanations for the differences between the two. Asked why their children seemed to have less awareness of the cognitive features of writing and why some made less use of long-term memory than adults, they suggested that the cognitive processes of writing were less well known to children than to adult writers, indicating an awareness that these processes required to be taught in the classroom. When asked to explain why there had been a shift in the importance of the social aspect of writing, the students suggested that the social skills were important for their children because it was recognised that this was supportive when developing writing skills and experience. They were of the view that for themselves as experienced writers, the importance of these social aspects of writing was no longer as significant and therefore the need for the social influence of writing was not as prominent for them as it was for their pupils.

Their explanatory comments were closely aligned to the discriminating features of expert writers (themselves) and novice writers (their pupils). Despite the more detailed teaching about novice and expert writers having not been given, these findings supported the conclusion from stage 9 that the students were clearly aware of the differences between the two models.

There were some areas where the students’ metacognitive view of writing remained weak. This was particularly noticeable with reference to understanding the role of memory in learning (and in writing) and the central part played by monitoring and control in metacognitive regulation in writing.



Despite these 'gaps' in the student metacognitive model of writing, it was concluded that the students' gain from completing a writer profile for their pupils had been particularly beneficial through providing first hand information about how children perceive the writing process. As well as reinforcing the notion that children see many components of being a writer, the information collected provided students with insights into how children learn to write and the influences on their success as writers. This awareness was expected to lead to a better understanding of children as writers and consequently of what was important in the teaching of writing. Overall there was a clear indication of success from stages 10 and 11 in that students had gained a generally more insightful approach to thinking about teaching writing.

There remained a concern about the students' limited knowledge and understanding about the role of memory in writing. To better understand how students (and teachers) might be able to integrate an awareness of the part played by memory in teaching writing, is probably worth further investigation.

## **Summary**

Stages 10 and 11 included a teaching session and a data collection session where there was a shift of focus from the students thinking about themselves as writers to thinking about teaching writing in the classroom. The teaching session re-examined how the Hayes (1996) model of writing and its use to create a writer profile, applied equally well to teaching writing to children as it did to students' as writers. This part of the teaching adopted a particular focus on the rules of writing and the cognitive processes of writing.

The new aspects of metacognitive skills which were introduced, were the role of attention and the use Short Term Memory in all thinking activities, including writing. The monitoring and control aspects of writing were re-introduced in the context the Nelson and Narens (1994) model of



metacognition and the manner in which the four stages in the cyclic model might apply in the context of teaching writing to children in the classroom was examined.

The complexity of the ground covered in this teaching session was recognised and the data collection stage which followed the teaching stage was designed to help students to consolidate their learning by asking them to complete a more familiar task of collecting data to produce a writer profile. The intended outcome was that this activity would highlight for the students their metacognitive awareness of the writing process, in particular as it might relate to their pupils.

The data collected for the pupils' writer profile indicated the importance of discussion within the social environment, a generally high level of motivation, the value of support for writing in the physical environment, the widespread place of planning and organising content within the area of cognitive processes, and a relatively low status for the role of long-term memory. There was a valuable gain by the students in having derived this information first hand in that it reinforced their awareness of the multi-component nature of being a writer and the consequences for teaching writing.

Comparison of the students' own average writer profile with that of their children, indicated a statistically significant difference between the two profiles. The most important features at the adult level (cognitive features and long term memory) had become the least important for the children with a reversal of the most important features for the children (social factors and motivation) which were the least important for the adults. This was interpreted as reflecting a perceived difference between expert and novice writers.

From later discussions with the students, they appeared to make some appropriate conclusions about why the writer profile for themselves and for their pupils was different. These decisions were valuable in the students' developing ability to think about teaching writing.



Possibilities for further research were identified in relation to the role of memory in writing and how teachers might integrate their knowledge and understanding of this into their teaching practices.

The conclusions from stages 10 and 11 reflected a generally satisfactory outcome for students in having demonstrated significant awareness of some of the differences between a metacognitive awareness of themselves as writers and a metacognitive awareness of teaching writing. The evidence from stage 11 confirmed the evidence from stage 9 (using a different data collection instrument) that the students were able to demonstrate that they had a metacognitive model of writing and that the models for themselves and for their pupils were different.







## **Chapter 9**

### **Stages 12, 13 and 14 Metacognition in practice**

#### **Function**

Stages 12, 13 and 14 included two teaching sessions and a data collection activity. Teaching covered the topics of memory in learning and regulation, both in relation to teaching writing in the classroom. In the data collection activity the students were asked to look for evidence of regulation in children's thinking about writing.

The intended outcome of stages 12, 13 and 14 was that the students would have advanced their metacognitive knowledge and understanding, in order to appropriately influence their teaching of writing in the classroom. To achieve this, the teaching sessions returned to the two aspects of memory and regulation which had been briefly introduced at earlier stages. The intention was to support the students in achieving greater success in adopting a metacognitive approach to teaching writing. Working towards doing so, was the final aim of this study and therefore the data collected in stage 14 were expected to be one indicator of its success.



## STAGE 12

This teaching session took place towards the end of the first term of the second year of the study, at a period in the BEd course when an understanding of the learning process was the focus of much of the general teaching in other areas of the course. The focus of stage 12 was on the role of memory in learning. This was not specifically included in other areas of the course and therefore this session provided the only explanation given to the students of this aspect of the learning process.

### Structure and content of the teaching

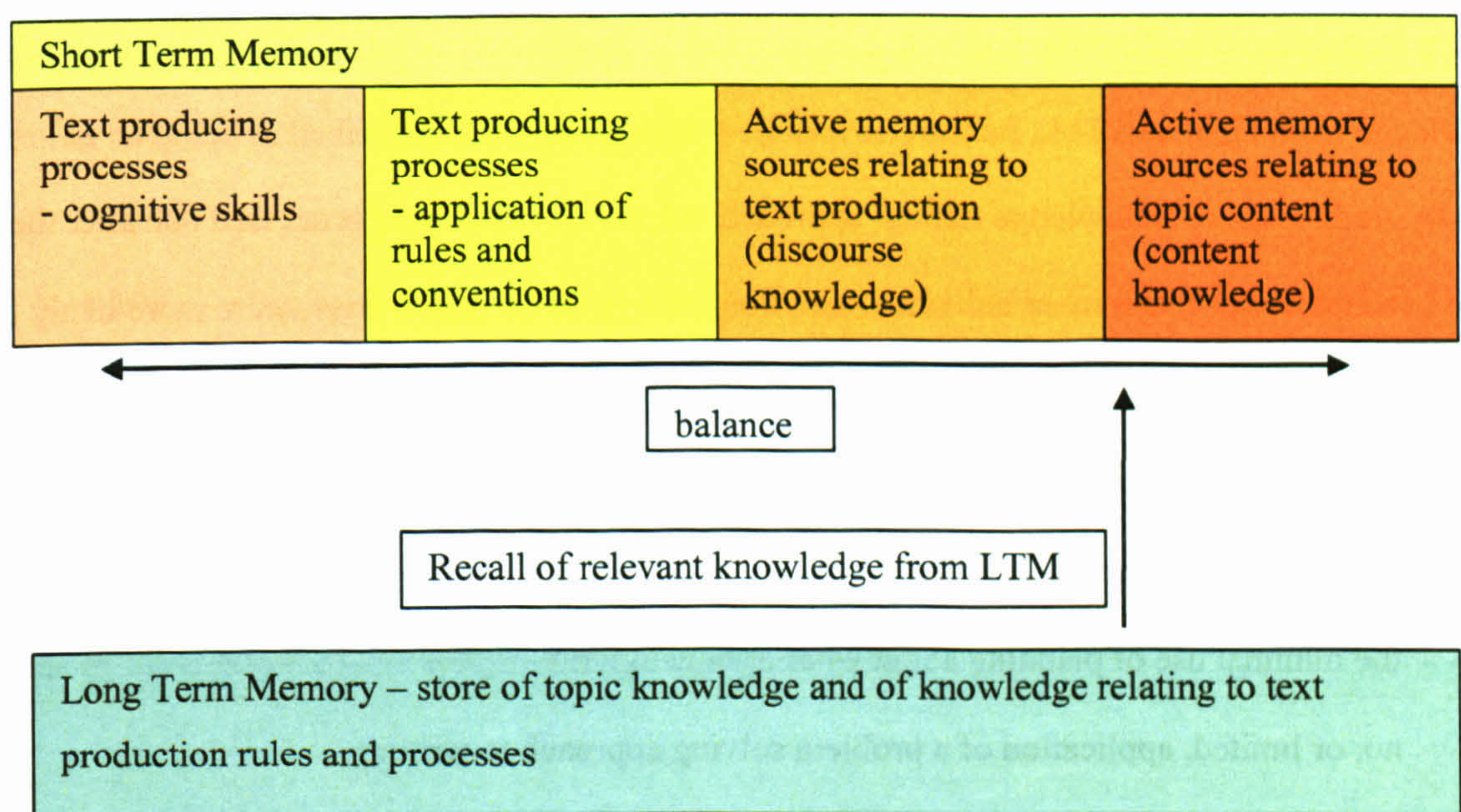
The session started with a description of the two different types of memory, Short-Term Memory (STM) and Long-Term Memory (LTM). In earlier discussions with the students, it appeared that many had a very uncertain knowledge of the two different types of memory and several claimed not to know the difference between them. In the teaching session, the major functional differences between STM and LTM were described, in the context of writing, namely that STM is the working space for most conscious mental activity and LTM is the repository for all the personal experiences which made up the content for writing, and knowledge about the rules and conventions for carrying out writing.

The concept of the limitation of attention, which had been introduced earlier, was further explained in the context of functioning alongside STM. The examples given were mainly in the context of writing, with a practical example of the difficulty facing many writers having to think about *how* to write and *what* to write, at the same time. This was demonstrated by asking the students to attempt a writing task taken from a study by Bourdin and Fayol (1994) who had shown that when expert writers are set a task where their normally highly fluent writing skills are masked by having to write in cursive upper case, they showed much poorer recall of content-related knowledge from LTM during writing.



The complexity of the competing demands on STM through attending to the skills of writing was explained using the simplified overview shown in Figure 9.1. The four elements suggested for STM were intended to give the students an indication of the likely aspects of writing which compete for the available memory space during the writing process, not to provide a definitive description of reality. It was explained that to enable a writing event to take place, there would have to be a balance across these four elements and the amount of Short Term Memory space allocated to each would probably not be equal. Kellogg (1994) referred to this as the level of “concentration” which a writer must give to each component. The proportion of each of them would be expected to vary from one individual to another, from one writing task to another, and from one instant to another during the same writing task. Kellogg also suggested that although the personal qualities of writers would influence their ability to allocate attention according to the several demands on Short Term Memory, it was often preferable to support beginning writers in concentrating on only a few of the items.

**Figure 9.1** Diagrammatic representation of interaction between LTM and STM



It was explained that the text producing processes were the same rules for writing and cognitive skills as described earlier at stage 10, where they had been the focus of the students’ attention during teaching writing while on school placement. The students agreed that these were ‘thinking’ elements of writing and with the help of some examples they were able to see that such thinking



probably did take place in Short Term Memory. The students had greater difficulty in comprehending the place of discourse knowledge in STM and the concept of 'automaticity' was introduced to show how the demand on STM could be reduced when writers have become fluent in applying discourse knowledge about writing procedures.

The importance of a balance of the demands on STM was explained in terms of the needs of novice writers compared with expert writers where some of the basic differences were:

- text production skills were more fluent in expert writers;
- knowledge of text producing rules and processes were less well developed in novice writers;
- topic (content) knowledge was more limited and less well organised in novice writers.

Accordingly, the balance between the four elements of STM (in Figure 9.1) would vary from more of the available memory space allocated to the text producing processes and discourse knowledge with novice writers, but more of the available space for content knowledge with expert writers.

The opportunity was taken to elaborate some of the other differences between expert and novice writers as suggested by Bereiter and Scardamalia (1987), particularly in terms of the exchange of knowledge from LTM to STM. For novice writers this exchange was described as being on an item-by-item basis, or 'knowledge telling' approach, where the items were processed one after the other in STM for inclusion in an individual's writing. Expert writers, however, were more likely to structure the information in LTM before transferring it to STM, and this was referred to as 'knowledge transforming'. These differences were summarised as follows.

Knowledge telling involved:

- the minimal use of planning about what or how to write
- no, or limited, application of a problem solving approach to writing
- a straightforward identification of the topic and genre for a specific writing task
- the targeting of specific and relevant information to be recalled from LTM
- material presented in the writing task as it is recalled
- limited monitoring.



Knowledge transforming involved:

- looking at different possibilities for the completion of a writing task
- thinking about potential content for a writing task from a relevance perspective as well as the more general 'does it fit?' criterion
- the interaction between relevance and content in a problem solving fashion so that each helps the other
- restructuring knowledge within the process of transferring it from LTM to STM
- writing becoming a process of discovery in that the writer knows more or has different perspectives after writing than before.

From this simplified explanation of differences between novice and expert writers, the teaching session examined some possible applications for writing instruction in the classroom. For example, novice writers required opportunities to become fluent in text production skills such as handwriting, spelling and grammar, awareness of genre, sentence construction. The more proficient that novice writers became in such skills, the lower would be the relevant demand on their STM. The importance of helping novice writers to access from long-term memory, and use in short-term memory, relevant knowledge about text production through 'supports', such as the writing outlines, notes, or lists, and other *aides mémoires*, was also demonstrated.

Before this teaching session, it was obvious that many students had a limited awareness of the function of short-term memory, did not fully appreciate the difference between STM and LTM, and were unaware that long-term memory was more than a repository for the ideas and thoughts relating to the *content* of writing. Through discussion and interaction during the teaching session, some of these uncertainties appeared to have been overcome.

## STAGE 13

This was the final teaching session giving essentially new material to the students. The focus was on regulation and how that might function in the context of writing. The intention was to help



students to see the central role of regulation in the implementation of a metacognitive approach to writing and to teaching writing.

As this was the only teaching session on regulation (it had been only mentioned in earlier teaching sessions) it was not possible to cover all its aspects and therefore a selective approach was adopted to give the students sufficient information to be able work towards adopting a regulatory approach while teaching writing in the classroom. Although the concept had been referred to in earlier teaching stages of this study, many students had only a poorly developed understanding of what regulation involved.

### **Structure and content of the teaching**

It was decided to link the ideas relating to regulation as closely as possible to the practical environment of teaching writing in the classroom. It was also decided that subsequent data collection should be seen to be closely aligned to the data collected earlier in this study and that as many previously used contexts as were feasible should be used for finding information about regulation in writing.

As an introduction to the concept, the students were invited to examine regulation of their own writing from two different perspectives. The distinction between these two was used by Harris and Graham (1992) and Harris, Schmidt and Graham (1998) in their research studies associated with the promotion of teaching regulation strategies. The first and more traditional view was based on specific writing competences linked with an identifiable product. The second, more contemporary, view focused on the writer's participation and performance. Harris and Graham described the *product-oriented* model as emphasising sentence construction and grammar rather than composition, with little emphasis on communication. They also suggested that it was associated with teachers having little knowledge about the teaching of writing but rather holding the notion that the skills of handwriting and spelling had to be mastered before the more complex processes of



text creation were introduced. Harris and Graham saw the *process-oriented* model as using writing to communicate and to solve problems where writing involved collaboration and sharing.

These models are summarised in Table 9.1 and were presented to students both as approaches to teaching writing and as ways of gauging the development of an individual's progress in becoming an effective writer. It was in this latter context that the concept of regulation was explained. It was also suggested that many would view that a necessary part of writers regulating their writing required being aware of both models - knowing the outcome (through the competence based model) and knowing how they achieved that (using the performance based model).

**Table 9.1** Two strategies for writing

<i>Competence based or product based model</i>	<i>Performance based or process based model</i>
The focus of writing is the task	The focus is on the engagement of the writer
The major components of writing are the rhetorical elements such as the plot and the structure of the content (story line if discursive or logical sequence if in report genre)	Writing is a social as well as a cognitive process and an awareness of the intended audience or reader is fundamental
The cognitive activities are centred on the selection of words and expressions	The cognitive influences are reflective as opposed to prescriptive
There is a strong reliance on rules and procedures such as spelling, punctuation and grammar	There is a reliance on motivational and environmental influences, including the collaborative nature of developing writing performance

Harris and Graham (1992) suggested the two models addressed different aspects of writing which were respectively more *functionally* cognitive or *socially* cognitive. They also suggested that in the performance based model there was an emphasis on the changing relationships which writers have with their environment as writing progresses. These relationships have also been described by Zimmerman (2000) as external and internal aspects of regulation to indicate developmental levels of regulation. The differences between external and internal regulation had previously figured in some of the earlier stages of data collection and the subsequent analysis and interpretation, in this study.



The students were asked to engage in a brief examination of themselves as writers from the two perspectives. This was carried out in open discussion and under these conditions the students found little difficulty in suggesting actions for regulation as indicated in the following examples.

Regulation activities based on a competence model;

- check back at the task as it was set
- look at the sequence and structure
- check the spelling, grammar and punctuation
- see if better expressions could be found

Regulation activities based on a performance model;

- ask someone to read it to see if it made sense
- think about whether it was personally satisfying
- share it with a colleague to identify suggestions for improvement
- read examples of good writing in the literature

To support the students' learning about regulation by looking for evidence during teaching writing in the classroom, it was felt that the students required a model of regulation to which they could relate their observations and findings. Two factors seemed to determine what this might be. The first was that it should not be a completely new model with little in common with their still relatively undeveloped knowledge of the psychology of teaching and learning. Instead, it was better to relate further teaching about regulation to current theories of development and learning with which the students were already familiar. Although there are several models of regulation in the literature, the decision was taken that most of them would be substantially apart (in the students' perception) from their current knowledge and understanding. The second factor related to the arrangements for the data collection (at stage 14) when the students would be placed in small rural schools, teaching classes covering the whole range of ages from 5 years to 12 years. The model of regulation which was based on a developmental structure was therefore seen as most appropriate and the teaching session concentrated on providing an explanation of Piaget's three primary types of regulation; autonomous, active, and conscious (as elaborated by Brown, 1987).



In Brown's analysis of Piaget's proposals, *autonomous* regulation was described as the continuous fine-tuning of behaviour, more in action or performance than in thinking, and might include such simple actions as improving pencil control while engaged in writing. *Active* regulation was described as the trial and error approach to testing the learner's understanding of ideas about composition. These ideas would be linked with external ("concrete") actions so that testing them would produce tangible results. An example might be copying others to improve one's own performance. *Conscious* regulation was presented as the mental reasoning which might be involved in reflecting during the engagement in a task, such as trying to think of better ways of expressing a view or a thought.

As the more general ideas and sub concepts associated with these three forms of regulation were already taught in the BEd course within the context of theories of learning and child development (particularly those of Piaget), it was felt that to apply them in a relatively new and challenging context might have been less daunting for the students than to address the newer ideas which figure in the models of regulation proposed by others (such as Carver and Scheier, 1998; Vermunt, 1998; Boekaerts, 1999; or Zimmerman, 2000, all of which are described in Chapter 2).

To further help the students to contextualise regulation in writing in the classroom, four of the categories of the Hayes (1996) model of writing were re-introduced as possible areas where the different types of regulation might be identified. These four categories were selected because they were already familiar to the students through the creation of a personal writer profile and a pupil writer profile and the contexts were assumed to be relatively clear and identifiable in the students' classroom experience. The four categories were the social environment of writing, the physical environment of writing, cognitive processes of writing, and motivation for writing. The fifth category which had been included in the writer profile (Long-Term Memory) appeared to be excessively complex to be analysed in terms of regulation and was therefore omitted. Some examples of regulation activities in each category were suggested and are given in Table 9.2.



**Table 9.2** Examples of regulation activities

<i>Social regulation in writing</i>	
Autonomous	Forming letters (handwriting) to accepted standard.
Active	Changing ideas while writing, by copying others.
Conscious	Taking the perspective of the reader while writing. Anticipating comments from others and taking account of them.
<i>Motivational regulation</i>	
Autonomous	Trying out writing in different media and materials (paint, sand, etc.).
Active	Seeking positive reinforcement ("am I OK?").
Conscious	Setting realistic personal goals. Recognising current emotional state. Countering emotional barriers to writing. Accepting the value of contributions from others .
<i>Physical regulation</i>	
Autonomous	Adjusting the writing environment to become more 'comfortable' with it.
Active	Making writing fit the task.
Conscious	Managing physical resources required for the task. Frequent reference back at what has been written. Adjusting time schedules and priorities for writing.
<i>Cognitive regulation</i>	
Autonomous	Correcting spelling and grammar as writing proceeds.
Active	Changing words rather than ideas in the content.
Conscious	Trying to think of better expressions or content. Drafting and revising for improved versions. Checking veracity of factual writing.

There were strong similarities between the selected categories for regulation in practice and the triadic-relationship approach adopted by Zimmerman (2000) and these were identified and explained to the students. The focus of establishing learning goals, promoted through Zimmerman's model (described in Chapter 2), was also seen as particularly appropriate for the students' investigation of metacognitive regulation in practice in writing lessons and the basic features of Zimmerman's model were briefly described.

The final part of this teaching session on regulation provided some suggestions about the teacher's role in supporting children to achieve a measure of regulation in writing. These suggestions were intended to provide the students with some simple ideas for promoting regulation and it was expected that they could be used and developed by the students as they gained in their understanding and experience of promoting regulation in teaching writing in the classroom.



The suggested teachers' actions were as follows.

*Social regulation* - get children to ask for comments from others during a writing activity; encourage children to share ideas with others as part of collaborative writing; indicate to children how they might imagine who the reader will be while composing their writing.

*Motivational regulation* - teach children how to set themselves realistic goals during a writing task; provide children with appropriate feedback to help promote their esteem; show children how to appraise their current successes in writing; provide a good teacher model of personal involvement and enjoyment in writing; give positive reinforcement of all successful attempts of pupils' writing.

*Physical regulation* - ask children to look back at what they have already written to help their next stage of writing; provide sufficient time in the classroom for writing and improving writing; help children to manage the physical resources they require for a writing task, such as writing material, resource material, space for writing, etc.

*Cognitive regulation* - teach children how to check their understanding of the writing task and to follow the instructions given; encourage children to change the words they have used for more expressive language; establish procedures so that the children will undertake drafting and revising activities to improve their own writing.

## **STAGE 14**

This stage involved collecting evidence of regulation in writing activities in the classrooms where the students were teaching during a school placement. The students were asked to look for evidence of regulation as currently practised by their pupils, although it was recognised that some students would still be struggling to grasp the concepts associated with this phenomenon. It was expected that consolidation of students' understanding of regulation in writing would be improved by their attempts to identify it in practice. This identification would in turn help them to examine the practicalities of regulation and how they might be able to encourage, promote and support some of the basic types of regulation in their own practice of teaching writing to children, but this latter



stage was not part on the present study. For the sake of 'completion', however, some brief guidance was given on simple techniques for encouraging regulation in writing (see appendix 5).

The students were asked to look for examples of all of three forms of regulation introduced earlier, namely; autonomous, active, and conscious regulation, in contexts with which they were already familiar; the social context, the motivational context, the physical context, and the cognitive context of writing.

The format of the data collection was similar to one of Winne and Perry's (2000) seven measurement protocols for regulated learning, 'observations of performance'. The value of using this approach was that it did not rely on learners giving reports about themselves and, as some of the children to be involved in this data collection were in the earliest years of the Primary school, this was particularly relevant. The use of observation of performance is usually taken to be more successful when the observers know quite lot about the context of the observations. In the teaching-writing contexts relating to the Stage 14 data collection, the students were participants in the preparation and promotion of the relevant children's learning. They were expected to find out a great deal about these teaching contexts and what led to them being used. They were therefore in a very good position to be able to make judgements about possible relationships between the pupils' writing behaviours and the writing contexts in which they were making their observations.

The students were asked to complete a simple form providing information about instances of regulation in each of the four contexts indicated. The form provided two types of support to the students; first by giving them examples of regulation (see Appendix 5) and secondly by providing a summary of possible teacher action which the students might undertake if they decided that the absence of any examples of regulation indicated that it did not occur in their classroom. The content of both of these supports had been given at the teaching session in stage 13. The students were encouraged to implement the suggested teacher actions as part of their teaching, both to help their understanding of the associated concepts, and to promote development of metacognitive regulation skills in their pupils.



A disappointingly small number of students in both samples responded to this data gathering activity, despite several reminders and the use of different formats of response (electronic and paper *pro formas*). It was assumed that the students were having difficulty with the activity although the students who were questioned about this were unable to articulate what these difficulties were. One possible explanation might have been that they had not fully grasped the concept of regulation or how it might be identified in practice, even though some examples of this had been given. It was later found that evidence for regulation in writing was poorly in evidence in the classrooms where these students were located. This probably contributed to the low level of response.

### **Data analysis**

The number of responses was 34 in total from the two experimental samples. There were only a few attempts at identifying the three different types of regulation (autonomous, active, and conscious) although all respondents made observations in each of the four areas, social, motivation, physical and cognitive. There were several responses which were not in the correct area, such as comments about social regulation appearing under the motivational regulation heading and comments relating to cognitive regulation appearing under motivation regulation. This appeared to confirm that some students had difficulty in fully understanding the complex nature of regulation as it was presented at stage 13.

For each of the four contexts observed, the responses submitted fell into three categories. One indicated the principal activities in regulation which the children had undertaken resulting in a positive outcome for their writing. These were different for the four contexts and are listed in order of their occurrence in Tables 9.3, 9.4, 9.5 and 9.6. Another category indicated where there was little or no regulatory action and some of the explanations for this were reported. The third category indicated that there might have been evidence of the influence of children's age on



regulation activities. Several students made comments which were in more than a single response category, producing 50 responses overall in social regulation, 35 in motivational regulation, 42 in physical regulation and 38 in cognitive regulation. These have been examined in each of the four contexts, separately.

*Social regulation*

A summary of the frequency of different responses given in this context is presented in Table 9.3.

**Table 9.3** Responses in the area of social regulation at stage 14

<i>Positive regulatory action</i>	No.
Discussions with peer group or as a class for sharing ideas and making changes	18
Consultations or interactions with teacher (or student) for advice on improvements	10
Willingness to take the perspective of the reader	7
Sharing may have resulted in children writing the same thing	3
<i>Absence of regulatory action</i>	
There was no audience awareness or taking the perspective of the reader	3
There was no discussion (because teacher told them what to improve)	2
Children were given a personal profile of writing goals which was rigorously followed	1
<i>Observed influence of age</i>	
Older children would follow advice or look for help, younger children less so	4
Older children were more aware of audience	2

Throughout each of the three categories of response, there were two principal types of social regulatory action, namely discussion with either the peer group or with the teacher, and considering the perspective of the reader. Evidence relating to discussions and sharing was reported in 62 % of the positive regulatory action responses and if the age-related responses are included, this rises to 70 % of all the responses recorded, suggesting a relatively high proportion of such regulatory action. The other type of social interaction related to being aware of an intended audience and this was reported in 24% of the responses, though not as a positive influence. It was clear that, within those responding, there was evidence of a substantial proportion of teachers attempting to promote regulation in their pupils’ writing by discussion with others.



### *Motivational regulation*

The responses given as examples of motivational regulation are summarised in Table 9.4. Positive reinforcement practices of praising children for their efforts in writing and promoting their self esteem through commendation and recognition of their achievements were the most widely reported positive influences on helping children to do better. These practices are typical of teaching methods used very widely in primary classrooms. The other, less frequent, responses offered in this category were all generally in the same vein of children and their work being recognised within the peer group, with the consequence of children feeling they were ‘accepted’ within that group.

**Table 9.4** Responses in the area of motivational regulation at stage 14

<i>Positive regulatory action</i>	No.
Positive response to teacher’s use of praise helped promotion of pupil self esteem	14
Children asked if what had written was OK	5
Sharing what had been written helped to raise self esteem	3
Children did not want to be different from others	1
They enjoyed making work good enough to be displayed	1
Motivated when writing on interesting topic or a subject of own choice	1
Children with high self esteem would experiment more	1
<i>Absence of regulatory action</i>	
There was not much present, writing was controlled by teacher instructions	2
Got teacher assistance in setting their own goals in writing	2
<i>Observed influence of age</i>	
Older children able to adjust their goals when checking, but younger children were not	3
Differentiated planning sheets are used	2

There was some evidence in these responses to indicate that motivational aspects of regulation operated at both the extrinsic and intrinsic levels. At the extrinsic level, the teachers praised the children to encourage them to achieve good quality writing and in some classes there was a ‘Writer of the Week’ award. At the intrinsic level, some students reported that their pupils were motivated to improve their writing to boost their self esteem or so that they would not appear to be different from others in the class.

There were relatively few occasions when motivational regulatory behaviour was reported as being absent and in these circumstances the students had identified some of the actions which were



suggested as relevant for teaching metacognitive monitoring and control. What did seem to be missing, however, was the setting of a good teacher model as a writer.

The comments relating to age differences were less obviously linked with the positive reinforcement suggestions and it might reasonably be taken that motivational regulation which is associated with praise and encouragement (external regulation) probably operated at all age levels.

### *Physical regulation*

With the examples of regulation linked with the physical environment of writing (given in Table 9.5), the majority referred to writing that had just been completed or to the resources which were in front of the writer while engaged in the writing task. These physical resources were obviously an important contribution to writers being able to know how well their writing was progressing. Sometimes these resources were part of the writer's own creation (such as what had already been written or the writer's own plan) and sometimes they were part of an external structure (such as a writing scheme or a word bank).

**Table 9.5** Responses in the area of physical environment regulation at stage 14

<i>Positive regulatory action</i>	
When prompted children would look at what they had written to see if it made sense	8
They used word banks, checklists, personal dictionaries, etc	5
Reading aloud to the teacher or to the class was effective in making improvements	3
The children checked against a plan	2
Some adjusted the writing environment (such as checking pencils, changing seat)	2
Resources (such as a writing scheme) worked well as a stimulus for writing	2
<i>Absence of regulatory action</i>	
They did not refer back to what they had written	8
They did not have a framework for writing	1
<i>Observed influence of age</i>	
Younger children did not persevere and just wanted to get finished	5
Older children did look back at what they had written more than younger pupils	4
Younger children not make much improvement after looking back	2

Where no regulatory action appeared to present, the reports indicated a relatively high incidence of *not* looking back at what had been written. Noting that the corresponding responses in the area



of positive regulatory action had generally indicated that prompting was part of this action (therefore indicating external regulation), it seemed that this was probably not a widely established means of independent or internal regulation.

The effect of different age was reported rather more frequently in this area and once again younger children were less likely to participate in regulation. An unwillingness to persevere was reportedly more apparent in this area than in the other areas of regulation.

### *Cognitive regulation*

The cognitive regulatory activities (summarised in Table 9.6) appeared to be closely linked with the skills which are taught widely in primary school classrooms as part of a writing programme, namely drafting and revising, reading aloud what had been written and engaging in discussion with others in the peer group.

**Table 9.6** Responses in the area of cognitive regulation at stage 14

<i>Positive regulatory action</i>	
Children undertook drafting, revising, use of thesaurus, etc.	8
Understanding of the writing was checked through reading aloud and discussion with the peer group and with the teacher	8
Children asked questions about what they were doing	3
Improvement was supported by teacher help in redrafting	2
Planning was usually an effective way of monitoring unless the sequence was changed	1
<i>Absence of regulatory action</i>	
Not much cognitive regulation – it was difficult for them	8
Could not concentrate on content and presentation (grammar, spelling) at the same time	1
<i>Observed influence of age</i>	
Older children asked questions, younger got on with the task	3
Older children managed cognitive regulation better than younger children	3
Rewritten stories often the same as before with younger children	1

It was noted that the contribution of the teacher to the promotion of regulation was mentioned frequently in this context. The evidence therefore suggested that cognitive regulation embraced a substantial element of external regulation. Where regulation was reported as being absent, the students felt that it was probably too difficult for their pupils, usually because they were in the



younger age range. There also appeared to be an age effect where even if younger children attempted what might have been regulation, the outcome was little better than if there had been none.

Taking all the stage 14 responses together, there were some identifiable trends and the most noticeable of these was the high incidence of externally supported or externally driven regulation. The influence of the teacher was identified in 42% of the responses which were judged to be linked with positive regulatory action, and a further 22% involved pupils sharing with their peer group. These findings suggest a high reliance on externally influenced regulation and it was felt that unless the teachers worked with their pupils to encourage a more internally oriented approach to regulation, the pupils might not achieve this progression themselves. To examine this more thoroughly, additional information was collected which had not been planned. This involved asking the students how much the teachers taught regulation in the classes where the students made their observations. As there was no specific information gathered about this at the stage 14 data collection, the students were specifically asked during discussion at stage 15, if the teachers with whom they were placed during the stage 14 data collection taught regulation skills in writing to their pupils. The responses from this request for additional information indicated that most teachers were largely unaware of regulation in learning and those few who were aware of it made no claims to teach it to the children in their classrooms, in any area of the curriculum.

Although it is not certain, it seems highly likely that most of these teachers did not teach regulation skills to their pupils to any significant extent on other occasions and, as the teachers covered the full range of the primary school, the teaching of these skills might be generally denied to children of all ages.

This finding about the low level of teaching regulation strategies in the classroom was unexpected. To verify if this was an accurate reflection of classroom practice a second unscheduled data collection activity was implemented. This involved the students of sample C completing, two years later, the same data collection form used in stage 14, and being asked the



same supplementary questions about whether teachers were aware of regulation and taught it to their pupils. At this time, the sample C students were at the end of the 4-year BEd course and had much more experience of teaching in the classroom. Their experience with regulation had covered several more classes and teachers, and it was assumed that the students' reports would reflect both a greater personal understanding of regulation and a more informed view of how (or whether) it took place in the classroom. These unscheduled additional data showed a noticeable similarity with the responses given two years earlier. Regulation in writing was still significantly reliant on teacher advice, with (as before) a lesser contribution made from the influence of the peer group. Children's skills in internal regulation were still generally poor, especially in the cognitive regulation area of proof reading, redrafting, and trying to find ways of making improvements or to check that the writing task remained goal-directed.

This new data also indicated that the students had attempted regulation strategy teaching during their teaching placements, but none was practised by the existing class teachers. Teachers also seemed not to present a good model of regulating learning in their interactions with their pupils. According to the findings of Vermunt (1998), the promotion of high quality learning is dependent on teachers strongly promoting the use of regulation strategies. The consequence of this, for the schools involved in the present study, has been little or no regular teaching of regulation skills in writing.

From the data collected at stage 14, there was evidence of an age factor. This ran counter to a suggestion by Boekaerts (1999) that it was a "misconception (that) younger children are inferior to older students in their use of metacognitive skills" (p 450). If the developmental models of regulation (such as that of Piaget) were considered, there would have to be some differences between younger and older children. In this study there was a clear picture that this was so at a general level. This had also been reported by Bereiter and Scardamalia (1987). In support of the reported age difference, several of the student reports at stage 14 drew a distinction between older children in the same class (most students were with multi-age 'composite' classes) being more able



to successfully use skills such as establishing writing goals, compared with their younger classmates.

### **Discussions and conclusions from stages 12, 13 and 14**

The area covered by stages 12, 13 and 14 was particularly important to the principal aims of this study in that it related to students' potential gains from the teaching sessions about metacognition and teaching writing. Although a final teaching session was to follow, there would be little new material introduced about metacognition and the concepts associated with it. Stages 12, 13 and 14 were therefore viewed as the key stages which examined metacognition in practice and in particular how the students interpreted metacognition in the context of teaching writing. It was at these stages that there was an opportunity to gauge the students' understanding of links between metacognitive knowledge and the metacognitive skills which were pertinent in the teaching of writing.

Throughout this study, there had been a consistent emphasis on the shifting of a focus on metacognition knowledge and skills from the student perspective to the perspective of the learner in the classroom. This emphasis was particularly important in stages 12, 13 and 14, although it would also be reflected in the final data collection at stage 16. In particular, the importance of the data from stage 14 was that it should reflect how far the students had progressed over the two years of this study towards being able to understand the place of metacognition in the teaching of writing and how they could contribute to children's understanding (and practice) of a metacognitive approach to writing.

The teaching sessions at stages 12 and 13 related to both metacognitive knowledge and to metacognitive skills. They also drew links, both directly and indirectly, with novice writers and expert writers. The extent to which the students might have been able to establish a broader understanding of metacognition and the teaching of writing was expected to be related to their



ability to link metacognitive knowledge and metacognitive skills for both novice and expert writers. For the students to understand and grasp the concepts associated with these ideas was an aim of this study, but additionally it was seen as important that the students might be able to both identify and subsequently to initiate opportunities for putting these ideas into practice. Stage 14 was the first major opportunity for this practical recognition and for an application of metacognition in practice to occur.

The conclusion from these three stages was that they each presented a substantial measure of difficulty for the students involved. Although there were no formal feedback sessions with stages 12 and 13, it was possible to gauge the students' reactions to both sessions through their interaction during the teaching sessions. In stage 12, the students initially had poor conceptions of the different aspects of memory (only short-term memory and long-term memory were introduced) and it was likely that some of students would not have overcome these difficulties in a single teaching session. There was also a lack of clarity in the discrimination between expert and novice writers. Although the concepts had been introduced earlier, the difference between the two states of being a writer was a difficult one to grasp for some students. This confusion would not have made understanding the role of memory in writing any easier to grasp, which was partly why the ideas about expert and novice writers had been introduced less formally at earlier stages. Some of the students were better writers than others and probably were more insightful about what contributed to being a good writer. Those who were poorer writers may have had a rather narrower perspective of how to discriminate between the success levels of different writers.

The difficulties experienced by the students in stage 13 lay in the relatively new (to them) concept of regulation. As this stage was very closely linked with the following data collection stage, a substantial proportion of the teaching was about how to identify regulation in practice and again a distinction was drawn between expert and novice writers. It was clearly insufficient to exemplify what might be observable in the classroom and the effort to contextualise regulation within a more theoretical framework was necessary. That regulation was a large part of metacognition, was prominent in this description, and some suggestions were given about the



different structures for identifying regulation, such as the four areas taken from the Hayes model of writing. A description was also provided of the forms regulation might take, using the Piagetian developmental model. Each of these approaches to regulation, its context or its format, probably made stringent demands on the students' comprehension of regulation, and linking all of them to promote the observation of regulation in practice was undoubtedly very difficult for some.

These difficulties were manifest at stage 14 where the response rate from the two samples was around 30%. The majority of the respondents did not respond using the forms of regulation indicated in the Piagetian model although they did give reports on observed features of regulation in each of the four areas taken from the Hayes (1996) model of writing. The relative familiarity of these areas to the students, from having used them twice previously in the creating of a writer profile, probably helped to support their use on this final occasion. Despite a limited range of responses, there were some identifiable trends within the examples of regulation reported by the students. The most marked was in the frequency of indications of external regulation compared with internal regulation and explanations for this were examined in terms of the teaching of regulation strategies in the classroom. The evidence collected seemed to suggest little in the way of such instruction in the classrooms where the students involved in this study had carried out their teaching placements. There was also some suggestion that the encouragement of learner autonomy in the realm of regulation in writing was at a generally low level.

Overall the conclusions from stages 12, 13 and 14 suggested that students had difficulties in coping with the learning demands made during the teaching sessions. The intention was that students might be able to extend their understanding of metacognition in practice through their classroom experiences during the data collection stage. This was where the concepts and ideas introduced earlier could be identified in the students' explanations of pupils' learning behaviour in the classroom. Probably for at least two main reasons, this understanding did not appear to happen to a substantial extent. One reason was the conceptual difficulties which the students had, prohibiting them from making much progress in the practical activity of identifying regulation in the classroom. The lack of students' full understanding of what they were looking for made it very



difficult for them to identify examples of it in practice. The other main reason is that in the majority of classrooms visited the teachers appear to have demonstrated little awareness of regulation and accordingly had devoted little attention to teaching regulation strategies to their pupils. This seems to be an area worthy of further research and investigation.

The unscheduled extra data collection two years after the end of the planned study indicated that the position in the classrooms had not changed but that the students had attempted to teach regulation strategies to their pupils. It was also noticeable that the students surveyed during this extra data collection stage were much more confident in their own knowledge of regulation as it related to teaching writing. This confidence had not been substantially present during the data collection of stage 14.

The overall conclusion from stages 12, 13 and 14 was that identifying metacognition in practice in the context of teaching writing had been a very difficult demand to make on students at the end of their second year in a 4-year BEd degree course. The conclusion from the unscheduled later data collection suggested that a further two years of teaching and classroom experience had helped the students to have a more confident approach to promoting the regulation aspects of metacognition in practice.

## **Summary**

Stages 12, 13 and 14 included two teaching sessions and a data collection session and the overall focus was on metacognition in practice. In the first teaching session the emphasis was on the metacognitive aspects of writing which functioned through Short-Term Memory and Long -Term Memory. The links between STM, attention and LTM were described with an emphasis on the role of STM in the mental actions involved in writing. This included an analysis of the balance of demands on STM from the text-production processes, and transferring discourse and content knowledge from LTM. The different circumstances for novice and expert writers were examined.



The second teaching session covered regulation and was linked with the preceding session through the differences relating to novice and expert writers. The Piagetian approach of a developmental structure for the operation of regulation was presented. To assist in the identification of regulation in practice, four areas were selected as being familiar to the students through them having been previously used in the creation of a writer profile.

The data collection session asked for students' reports of evidence of regulation as a part of children's writing activities in the classes where the students were teaching while on school placement. The students appeared to have difficulty with this as only about a third of the samples completed a response. The findings covered all the four areas recommended to the students and presented a broadly similar picture across each.

The three stages, 12, 13 and 14, were focussed on interpreting metacognition in practice in order to help the students link the theory of metacognition to its practical application. A conclusion was that the students had found the theory difficult to grasp and its implementation in practice hard to achieve. The evidence collected indicated that regulation in writing, where present, was linked more with external regulatory features than with internal features. It was also reported by the students that there was widespread absence of teacher awareness of regulation in writing with consequent little or no teaching of regulation skills in the classroom. Later, unplanned data collection confirmed the position relating to teachers, but suggested that the students had become more confident in their own understanding of regulation in writing. This awareness of the presence or lack of regulation practices in writing in the classroom was seen as further evidence of the students having established metacognitive models of writing for themselves and for their pupils.

Opportunities for further research were identified in the need to examine the apparent absence of teaching regulation skills in the classroom and the influence that might have in restricting internal regulation activities in writers.



## **Chapter 10**

### **Stages 15 and 16**

#### **A metacognitive model of writing**

##### **Function**

Stages 15 and 16 were the final teaching and data collection sessions of the two-year study. Together they were planned to bring together the ideas and concepts from the earlier teaching sessions through the identification of some unifying links and common ground. The data collection session was expected to indicate how the students might have reflected on their participation over the two-year period, through their responses to the measure of metacognitive thinking initially used in stage 1.

##### **STAGE 15**

Some of the ideas introduced through the earlier teaching stages of this study were substantially new to the students and were often difficult to assimilate. Similarly, the data collection activities, although planned to help further student learning, often involved the students in dealing with complex underlying concepts which made the practical activity challenging and complicated.



Also, the context of writing which had been necessarily been prominent in the presentation of some of these new ideas might not have been the easiest context for students to comprehend some of the theory presented. A major function of the final teaching stage was therefore to indicate that many of the ideas presented, were interlinked and mutually supporting. By taking a more 'complete' view of the earlier stages, the students were encouraged to see that it was possible to have a metacognitive model of writing.

### **Structure and content of the teaching**

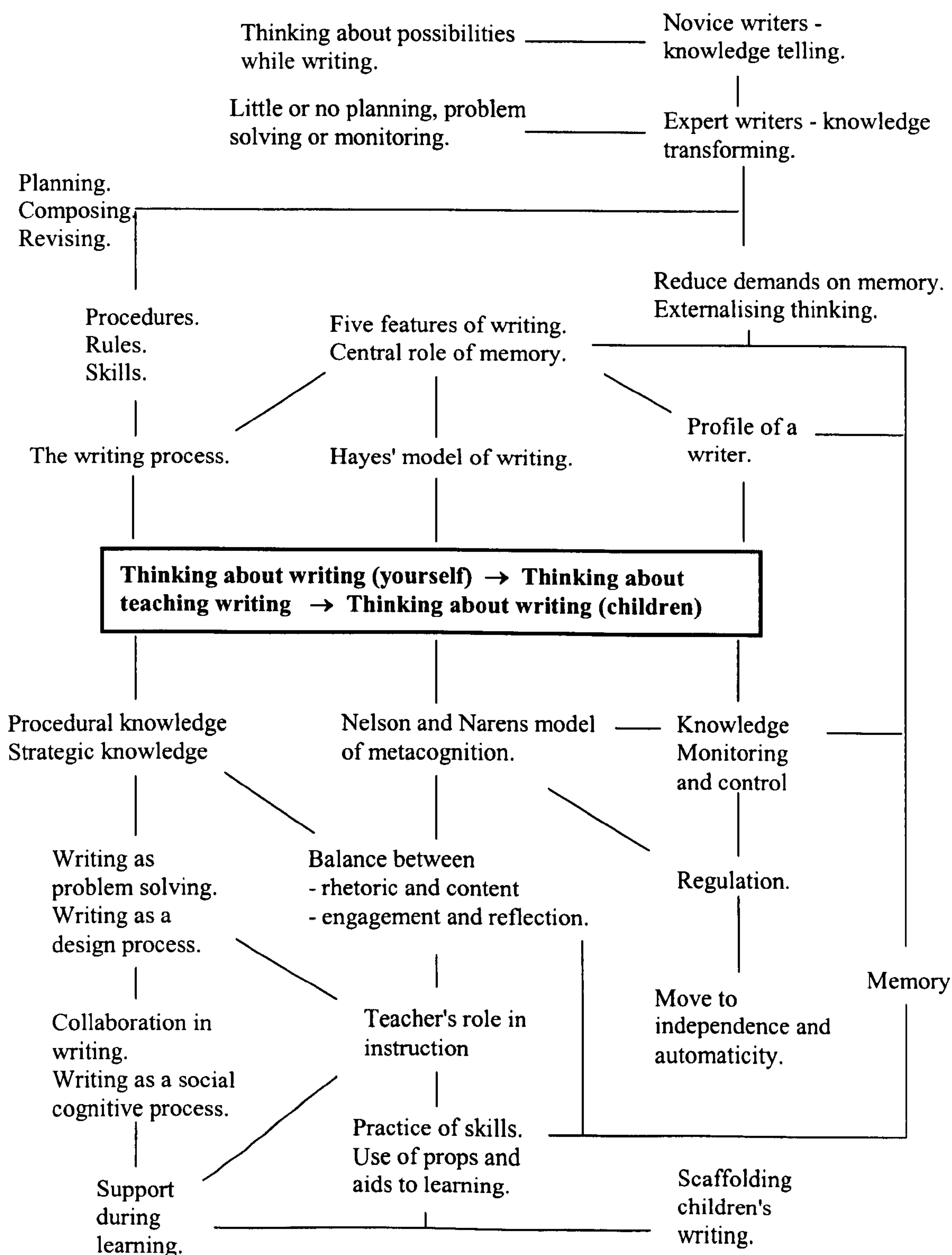
A diagram was prepared to present the key concepts of the earlier teaching, using as its central element, the purpose of the study, which was to promote thinking about writing (see Figure 10.1). The elements of this composite picture were presented diagrammatically to indicate that many of the ideas and concepts introduced in this study were interlinked. Lines on the diagram in Figure 10.1 indicated these links, but it was suggested that the juxtaposition of the elements and interconnecting lines given, were not the only way of indicating possible relationships between the elements. Although only a few students might have carried it out, encouragement was given to the students to create their own links and to draw different interconnecting lines or to use no lines, as they attempted to understand the structure of the composite picture.

The central focus of the two year study had been "thinking about writing", starting with students thinking metacognitively about their own writing, before thinking metacognitively about teaching writing to children in the primary school classroom. The final part of this development of students' thinking was to encourage them to teach writing in such a way that *their pupils* would begin to think metacognitively about their own writing. This final part had been introduced only at stages 13 and 14. It was recognised that the limitation of this study to the first two years of the teacher education course meant that a clear measure of achieving success in the final part was beyond the scope of the study and if there were such gains, they were likely to be determined in the longer term. To compensate for the likelihood of this longer term influence, the students were encouraged



to use the present study as a focal point for promoting the achievement of metacognitive thinking about writing in their pupils, as they progressed through the BEd course and in their professional practice.

**Figure 10.1** Diagram suggesting links between course input elements





The central element of the diagram in Figure 10.1 was taken as the starting point of the teaching in stage 15 and the students generally recognised that they had progressed from thinking about themselves as writers to thinking about teaching writing in the classroom. They also agreed that they recognised the relevance of promoting thinking about writing in the children they were teaching, although the experience they might have had of this in their classrooms was probably limited. During this teaching session, a selection of the elements shown in the diagram in Figure 10.1 was discussed or elaborated, but the main focus was on the interconnections between the elements and taking them in isolation in this summary belies the nature of the teaching session. In addition, there was a small amount of new information presented in the final teaching session and this was on the occasions where it was felt necessary to 'fill a gap' in the material which had been given throughout the teaching during the preceding two years.

### **Elaboration of the content of the teaching**

Not all the items shown in Figure 10.1 were elaborated during the teaching session and not all of those which were, are covered in the following description, which is limited to those about which most of the comment was made.

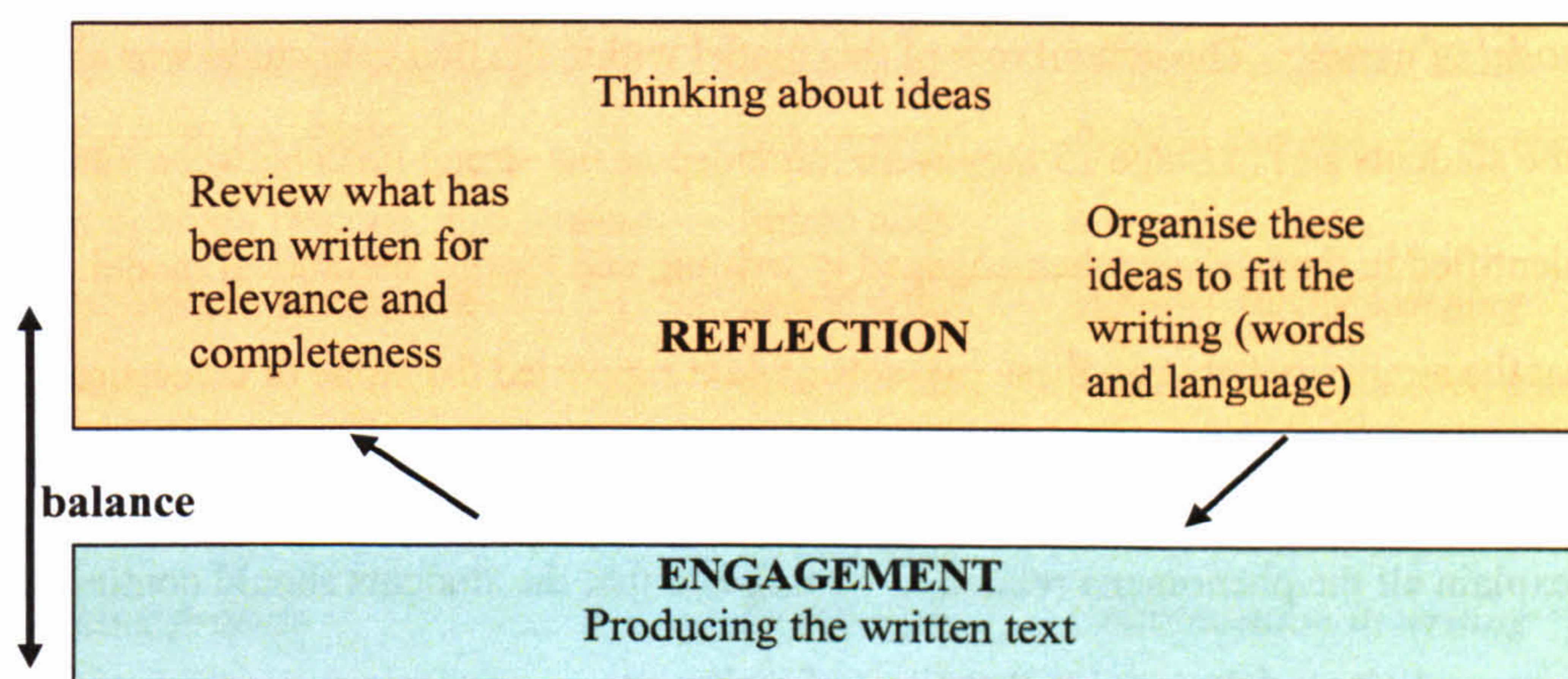
*Nelson and Narens model of metacognition.* The important point made in reference to the Nelson and Narens model of metacognition was that its emphasis on linking knowledge held by the writer and his participation in monitoring and control, were applicable in all the three contexts relevant to this study. These contexts were: the student as a writer; the student as a teacher of writing; and a school pupil engaged in writing in the classroom. To exemplify this during the teaching session, the students were encouraged to suggest examples of metacognitive knowledge and metacognitive regulation as they might occur in each perspective.

*Memory.* The previously introduced representation of a balance between the competing demands on space in short-term memory between the writing functions related to rhetoric and those



related to content (see Figure 9.1 in Chapter 9), was re-presented. This view of the function of memory in thinking about writing was contrasted with a different model by Sharples (1999) where a cycle of engagement and reflection in writing takes place in working memory. A feature of this is that these two processes do not take place simultaneously (see Figure 10.2) suggesting further evidence of the natural balance between competing mental activities within short-term memory.

**Figure 10.2** Balance between engagement and reflection in memory (adapted from Sharples, 1999)



On the basis of the proposals of Sharples (1999), it was suggested to the students that many writers, particularly children, might proceed through a cycle of engagement – reflection – engagement while writing. The students readily recognised that having to ‘stop and think’ (reflect) about what they are going to write next, was a common occurrence for children in their classroom writing activities.

*Teacher’s role in instruction.* This was described in the context of current good practice in many primary classrooms. Where differences with current practice might be found would be in the students’ metacognitive awareness of the writing process, including aspects such as the importance of memory, automaticity in the processes of writing, social factors, and regulation. The students were advised to constantly appraise their own role in providing support for their pupils from their metacognitive understanding of writing and to adjust the assistance they would give their pupils accordingly. The students were advised to encourage their pupils to adopt a metacognitive approach to their own writing.



It was appropriate to draw students' attention to the teacher's role in the context of promoting the practice of writing skills and the use of aids to learning. The danger of teachers being prescriptive in their expectations of children's writing behaviour was contrasted with a less rigid approach of encouraging reflection and understanding of the process of writing. The evidence collected at stage 14 indicated that many teachers were substantially prescriptive in the teaching of writing, thus reducing opportunities for the writer-initiated internal regulation.

*Hayes' model of writing.* The central role of this model within the two year study was already apparent to the students and in Stage 15 they were reminded of the strong links between what they had earlier identified in themselves when engaged in writing, and Hayes' theoretical model. It was suggested that the similarity between these two sets of data supported the value of theoretical models in reflecting and explaining practice. It was suggested that no single model should be expected to explain all the phenomena related to writing and that the students should continually search for more explicit models or reconstructions of reality.

*Regulation.* Feedback was provided to the students giving the most frequent suggestions received from student returns at stage 14. These indicated higher levels of external regulation than internal regulation and the age difference where regulation was more apparent in older children than in younger children. The students agreed that they saw little evidence of teachers presenting a good role model as a writer and little or no attention given by class teachers to encouraging pupil-initiated internal regulation in writing.

*Profile of a writer.* The development of the Hayes model of writing into a profile of a writer was a new contribution to understanding metacognition and writing. The summary profiles from the information submitted by students, relating both to themselves as writers and to their pupils (see Figure 8.2 in Chapter 8), were re-presented in stage 15, along with the key findings from the earlier data collections stages. The students generally accepted that creating writer profiles for themselves and for their pupils had been a worthwhile activity.



Finally, as part of the explanation of *the writing process*, the Hayes model was found by the students to be largely effective in understanding of the *five features of writing* and the *central role of memory*. It was expected that this understanding of the writing process, initially for themselves as writers and subsequently as they would teach it in the classroom, would be a significant contributory element in the students' ability to link together several of the features in Figure 10.1. Consequently, to promote the students' understanding, they were asked, during the teaching session, to make suggestions for relationships (links) between the elements presented in the diagram. Some of the suggestions made were:

<i>Planning, Composing, Revising</i>	linked with	<i>Procedures, Rules, Skills</i>
<i>Procedures, Rules, Skills</i>	linked with	<i>Reduce demands on memory</i>
<i>Balance between rhetoric and content</i>	linked with	<i>Memory</i>
<i>Teacher's role in instruction</i>	linked with	<i>Support during learning</i>
<i>Regulation</i>	linked with	<i>Move to independence and automaticity</i>
<i>Knowledge, Monitoring and Control</i>	linked with	<i>Writing as problem solving</i>
<i>Memory</i>	linked with	<i>Novice writers, Expert writers</i>
<i>The writing process</i>	linked with	<i>Collaboration in writing</i>

This evidence of determining their own links was taken as indicative of the students having made some gains in their understanding of the teaching associated with this study.

## STAGE 16

This was the final stage of the study and involved the collection of data from samples A, B and C, in a re-application of the questionnaire used at stage 1. The administration of this stage took place within the last two weeks of the academic session, two years after each sample had been asked to complete the same set of questions at stage 1. For sample A and sample C this was at the end of the second year of the BEd course and for sample B it was at the end of their third year.

The same seven questions asked at stage 1, along with the request to give a sample of writing, were re-presented. The response rate, however, was noticeably poorer than it had been at stage 1



and this may have been partly due to stage 16 occurring at the end of a session rather than at the beginning. It might also have reflected the students’ reduced level of motivation. The conditions of data collection were as near identical to those existing in the initial stage as was possible, in terms of environment (in a lecture room), time and day of the week and amount of time available.

**Data analysis**

The principal analysis of the data focused on examining the differences between the two applications of the data collection instrument (between stage 1 and stage 16) to identify changes in students’ metacognitive knowledge and understanding over the two-year study. In order to make comparisons between the two stages more appropriate, the data used were restricted to those students who responded at both stages. This resulted in a reduction in the numbers of respondents at stage 1 and the details are shown in Table 10.1 for all stages where this data collection instrument (or a part of it) was used. As suggested at stage 9, perhaps one explanation of the attrition was the loss of students during the first year of their course. This cause is less likely in the later years of a 4 year course and the drop in numbers at stage 16 may have been due to a loss of interest or to the difficulty which some students undoubtedly had in coping with the teaching and data collection sessions. In addition, a small number of the students at stage 16 did not complete the writing activity.

**Table 10.1**      Numbers of respondents at stages 1 and 16

	<i>stage 1</i>	<i>stage 9</i>	<i>stage 16</i>
	<i>number of respondents</i>	<i>number of respondents</i>	<i>number of respondents</i>
<i>sample A</i>	54	41	38
<i>sample B</i>	36	33	23
<i>sample C</i>	76	40	39
<i>Totals</i>	166	114	100

- Question 1.** “Define good writing”
- Question 2.** “What makes a good writer?”



As with the stage 1 analysis, questions 1 and 2 were considered together to identify students' metacognitive knowledge about the concept of writing. The same categorisation of responses was used at both stages. These categories were 'presentation', 'content', 'process' and 'the reader' and a summary of the responses is given in Table 10.2 along with results of tests for significant difference (chi-square) between the responses at stage 1 and stage 16 for each sample.

**Table 10.2** Summary of responses to questions 1 and 2 at stage 1 and stage 16 and significance of differences for each sample

<b>Question 1</b>	<i>sample A</i>			<i>sample B</i>			<i>sample C</i>		
<i>Response category</i>	<i>N = 38</i>		<i>significance</i>	<i>N = 23</i>		<i>significance</i>	<i>N = 39</i>		<i>significance</i>
	<i>stage 1</i>	<i>stage 16</i>	<i>P =</i>	<i>stage 1</i>	<i>stage 16</i>	<i>P =</i>	<i>stage 1</i>	<i>stage 16</i>	<i>P =</i>
presentation	20	13	0.105 NS	12	10	0.555 NS	24	22	0.645 NS
content	9	21	0.005 **	12	12	1.000 NS	14	19	0.252 NS
process	5	24	0.000 **	6	10	0.216 NS	8	26	0.000 **
the reader	29	30	0.783 NS	14	20	0.054 NS	31	23	0.052 NS
<b>Question 2</b>	<i>sample A</i>			<i>sample B</i>			<i>sample C</i>		
<i>Response category</i>	<i>N = 38</i>		<i>significance</i>	<i>N = 23</i>		<i>significance</i>	<i>N = 39</i>		<i>significance</i>
	<i>stage 1</i>	<i>stage 16</i>	<i>P =</i>	<i>stage 1</i>	<i>stage 16</i>	<i>P =</i>	<i>stage 1</i>	<i>stage 16</i>	<i>P =</i>
presentation	4	5	0.723 NS	7	4	0.300 NS	5	10	0.151 NS
content	20	18	0.646 NS	14	12	0.552 NS	26	18	0.068 NS
process	10	19	0.034 *	6	8	0.522 NS	7	20	0.002 **
the reader	13	14	0.811 NS	10	15	0.139 NS	23	18	0.257 NS

\* = significant at  $p < .05$  level    \*\* = significant at  $p < .01$  level    NS = not significant

Some significant differences were found for sample A and sample C, in both question 1 and question 2, but not at all for sample B. The difference between stages 1 and 16 was consistently in the category of 'process' (procedural knowledge), largely at the highest level of statistical significance. The experimental groups certainly gave more responses at stage 16 and this may have reflected their enhanced awareness of the writing process after the two years of the study, whereas the control group may not have changed much in this aspect of their knowledge. There was also a statistically significant difference for sample A in question 1 relating to content (declarative knowledge) but this was not replicated for sample C or in the responses to question 2.

The actual responses given by the students in the process and content categories were examined more closely to see if the observed statistically significant changes were reflected in the nature of the comments made. It was found that responses given at stage 16 were more extensive and more



detailed possibly suggesting a deeper level of thinking about metacognitive knowledge at the later stage.

**Question 3. “What are the steps you would go through to produce a piece of academic writing (such as an assignment)?”**

The information collected in question 3 was intended to focus on the students' *procedural* knowledge about writing. The content of responses given at stage 16 were found to match closely that given at stage 1 and so the same categories were used for this later analysis (see Table 10.3).

**Table 10.3** Summary of responses to question 3 at stage 1 and stage 16

Response category	sample A			sample B			sample C		
	N = 38		significance P =	N = 23		significance P =	N = 39		significance P =
	stage 1	stage 16		stage 1	stage 16		stage 1	stage 16	
Check understanding of the task	1	21	25.589 **	7	6	0.107 NS	6	22	14.263 **
Plan at the pre-writing stage	17	27	5.398 *	18	19	0.138 NS	23	28	1.416 NS
Identify thoughts and ideas	16	10	2.105 NS	6	5	0.119 NS	5	12	3.686 NS
Research and make notes	15	21	1.900 NS	13	19	3.696 NS	26	30	1.013 NS
Create and follow a structure	17	8	4.828 *	12	12	0.000 NS	12	9	0.586 NS
Write a draft	16	25	4.290 *	12	13	0.088 NS	23	27	0.891 NS
Edit, check spelling or proof read	7	12	1.754 NS	6	10	1.533 NS	13	29	13.206 **
Put in quotes or references	3	0	3.123 NS	2	1	0.357 NS	2	1	0.347 NS

\* = significant at p<.05 level    \*\* = significant at p<.01 level    NS = not significant

The analysis of these data indicated that there was a significant difference between the two stages for four items with sample A, for two items with sample C and not at all with sample B. The only item which was statistically significantly different for both experimental samples was also at the 1% level of significance, namely 'check understanding of the task'. One further item was statistically significant at the 1% for sample C referring to editing and checking, with three further



steps significant at the 5% level for Sample A, that is items related to planning, creating a structure and writing a draft.

To find an explanation for these findings an examination was made of the rank order of the frequency of occurrence of the responses (summarised in Table 10.4) and this indicated a substantial degree of consistency in sample B across the two stages, but several changes in the two experimental samples. The largest changes were those which involved more than a single quartile position, as follows.

From lower to higher quartiles: “Check understanding of the task” (regulation skill) – sample A  
 “Edit, check spelling or proof read” (regulation skill) – sample C  
 “Research and make notes” (composition skill) – sample A  
 From higher to lower quartiles: “Create and follow a structure” (composition skill) – samples A, C  
 “Identify thoughts and ideas” (composition skill) – sample A  
 “Write a draft” (composition skill) – sample C

**Table 10.4** Rank order and quartile distribution for responses to question 3 at stages 1 and 16

<i>Response categories</i>	<i>sample A</i>		<i>sample B</i>		<i>sample C</i>	
	<i>stage 1</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 16</i>
Plan at the pre-writing stage	1=	1	1	1=	2=	3
Research and make notes	5	3=	2	1=	1	1
Write a draft	3=	2	3=	3	2=	4
Create and follow a structure	1=	7	3=	4	5	7
Edit, check spelling or proof read	6	5	6=	5	4	2
Check understanding of the task	8	3=	5	6	6	5
Identify thoughts and ideas	3=	6	6=	7	7	6
Put in quotes or references	7	-	8	8	8	8

First quartile (upper)		Third quartile	
Second quartile		Fourth quartile (lower)	

The interpretation of the data given in Table 10.4 appears to offer more help in identifying the changes which had taken place across the two years of the study than the statistical analyses reported in Table 10.3 and the findings suggested that the experimental samples had responded with more awareness about regulation skills at the end of the two year programme than had been apparent at the beginning.



#### Question 4. “What would you do to improve a specific piece of your own writing?”

This question was more directly related to the regulation process of monitoring and control and was intended to indicate students’ actions in relation to these procedures.

As indicated in Chapter 4, the responses to question 4 at stage 1 were categorised as monitoring activities if they related to the students’ activities in looking, seeking or generally collecting information about their writing or about improving their writing. A distinction was drawn between high level monitoring and low level monitoring, where the former applied to activities at a higher metacognitive level involving mental comparisons with writing styles or processes, or where some form of metacognitive review appeared to be the focus of the students’ action. High level monitoring activities were clearly related to *internal* regulation. Responses were taken as lower level monitoring where the metacognitive engagement involved accepting the views and opinions of others or the less cognitively demanding review of actions such as checking grammar, spelling or punctuation. Low level monitoring activities were largely related to *external* regulation. The control activities were not differentiated into ‘higher’ or lower’ though they were indicative of *changes* the students felt they could or should make to their writing.

The twelve response categories were arranged as follows.

##### Monitoring activities - high level

Read and learn about this style of writing  
Reflect or think about what has been written  
Read to find where to make improvements

##### Monitoring activities - low level

Check the grammar, spelling or punctuation  
Get advice from a tutor  
Ask for help or another opinion (unspecified)  
Ask for the opinion of a colleague

##### Control activities

Take action to make improvement (unspecified)  
Make changes to use better words or expressions  
Make improvements to the content  
Undertake some form of rewriting or redrafting  
Research the topic further (content information gathering)

As at stage 1, the data were examined in two ways. First, the distribution of responses across the three categories was analysed (using chi- square) to compare the findings at the two stages.

This is summarised in Table 10.5.



**Table 10.5** Numbers of responses in the major categories for question 4 at stages 1 and 16

Response Category	sample A			sample B			sample C		
	N = 38		significance P =	N = 23		significance P =	N = 39		significance P =
	stage 1	stage 16		stage 1	stage 16		stage 1	stage 16	
High level monitoring	19	18	0.053 NS	17	22	4.212 *	26	22	0.867 NS
Low level monitoring	25	26	0.060 NS	16	16	0.000 NS	25	30	1.542 NS
Control	15	25	5.278 *	14	17	0.890 NS	24	22	0.212 NS

\* = significant at  $p < .05$  level    NS = not significant

There were only two instances of a statistically significant difference, one indicating a larger number of responses in the 'control' category from an experimental group and the other suggesting an increase in responses in a 'monitoring' category for the control group. The second analysis, also carried out at stage 1, examined how each individual student had responded rather than the number of different responses made by the whole sample and this is summarised in Table 10.6.

**Table 10.6** Students responding in the major categories for question 4 at stages 1 and 16

Response category	sample A (N = 38)		sample B (N = 23)		sample C (N = 39)	
	stage 1	stage 16	stage 1	stage 16	stage 1	stage 16
High level monitoring responses only	5	3	5	6	3	4
Low level monitoring responses only	8	9	4	2	5	5
Both high level and low level responses	10	3	5	3	11	10
High level monitoring and control responses	2	6	4	3	4	5
Low level monitoring and control responses	5	8	3	5	5	11
High and low level monitoring and control responses	3	5	1	2	5	2
Control responses only	5	4	1	2	6	2
	Chi-square = 7.631 df = 6 p = 0.266    NS		Chi-square = 2.567 df = 6 p = 0.861    NS		Chi-square = 5.837 df = 6 p = 0.442    NS	

NS = not significant

This analysis indicated no statistically significant changes from stage 1 to stage 16 although some trends were identified. There was a lowering in the number of responses in the 'monitoring only' categories between stage 1 and stage 16 with sample A and a rise in the number of responses in the 'monitoring plus control' categories for both experimental samples. This suggested that the students had become more aware of their control activities, however overall there was little obvious shift from external regulation as indicated by the low level monitoring responses to internal regulation indicated by the high level monitoring responses.



Perhaps the increase in ‘monitoring plus control’ suggested an increase in metacognitive awareness and therefore these figures were compared with students’ writing grades at stage 16. There were 37 students in this category at stage 16 and 20 (54%) of them had been given the higher writing grades. A full breakdown of the writing grades for these 37 students is given in Table 10.7 and suggested a strong link between the better writers and an increased awareness of metacognitive regulation of writing, confirming an earlier finding at stage 7 that the better writers were more aware than their lower graded colleagues of monitoring in the regulation of writing.

**Table 10.7** Distribution of stage 16 writing grades for stage 16 responses under ‘monitoring plus control’ in question 4 (samples A and C combined)

	<i>Grade 1 (lowest)</i>	<i>Grade 2</i>	<i>Grade 3</i>	<i>Grade 4</i>	<i>Grade 5(highest)</i>
<i>Number of students</i>	3	6	8	10	10

**Question 5.** “What do you think these terms mean in relation to writing? – *internal thoughts; genre; purpose; memory.*”

The definitions used in response to question 5 were the same as those given at stage 1, permitting the same response categories to be used and a summary is given in Table 10.8. There was found to be a statistically significant difference between the distributions of responses at stage 1 compared with stage 16 for sample A and sample C but not for sample B. The most likely causes of these differences appeared to be consistent with increases in the number of responses for the most popularly given definition, with a reduction in the numbers of responses for the remaining definitions. This was evident for three of the terms for both samples A and C and in the fourth term for sample A only.

In the case of the term “memory”, in addition to the increase in the number of responses to the most popular definition, an apparent anomaly noted earlier at stage 1 when sample C had appeared to be significantly different from the other two samples in the number of responses the students had



given suggesting that memory in writing related to what was remembered *after* writing, was no longer evident. By stage 16, few students in either sample gave this definition of ‘memory’.

**Table 10.8** Summary of responses to question 5 at stages 1 and 16

	<i>sample A (N = 38)</i>		<i>sample B (N = 23)</i>		<i>sample C (N = 39)</i>	
<i>Definitions given</i>	<i>stage 1</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 16</i>
Internal thoughts						
thoughts and ideas	25	32	17	21	24	30
feelings	9	4	4	1	11	8
imagination	1	1	1	1	3	1
no answer	3	1	1	-	1	-
Genre						
type, style or form	27	37	19	21	27	37
subject or theme	5	1	3	2	4	2
other/no answer	6	-	1	-	8	-
Purpose						
why it is done	25	30	15	18	26	25
achieve an outcome	11	7	8	3	13	14
other/no answer	2	1	-	2	-	-
Memory						
bring in past experiences	15	21	3	9	17	25
remember after reading	11	1	7	2	18	3
skills used in writing	4	6	3	5	1	6
no answer	8	10	10	7	3	5
	Chi-square = 25.644 df = 13 p = 0.019 *		Chi-square = 15.874 df = 13 p = 0.256 NS		Chi-square = 29.736 df = 13 p = 0.000 **	

\*\* = significant at p<.01 level \* = significant at p<.05 level NS = not significant

These findings seemed to indicate that experimental samples had become significantly more focused in their views about the meanings of the terms given in question 5 and this might be an indication of an increase in the students’ task-related metacognitive knowledge.

**Question 6. “Assess yourself as a writer (use whatever descriptors you wish). My strengths. My weaknesses.”**

At stage 1 of the study a categorisation of responses was derived using 5 prime categories and 3 minor categories. These were found to match the data collected at stage 16 except that the numbers in the minor categories had become very small and were frequently nil. It was therefore decided to conflate the minor categories under a single heading, “other responses” and they were excluded



from the statistical analyses. The responses are summarised in Table 10.9 and presented along with the statistical analysis (using chi-square) for each stage between stages 1 and 16.

**Table 10.9** Frequencies of categories of response to question 6 at stages 1 and 16

<b>My strengths</b>	<i>sample A</i>			<i>sample B</i>			<i>sample C</i>		
<i>Response Category</i>	<i>N = 38</i>		<i>significance P =</i>	<i>N = 23</i>		<i>significance P =</i>	<i>N = 39</i>		<i>significance P =</i>
	<i>stage 1</i>	<i>stage 16</i>		<i>stage 1</i>	<i>stage 16</i>		<i>stage 1</i>	<i>stage 16</i>	
Preparation for writing	7	17	6.090 *	3	4	0.168 NS	6	13	3.409 NS
Content of writing	14	10	0.974 NS	9	12	0.789 NS	19	10	4.446 *
The writing process	7	7	0.000 NS	1	6	4.212 *	6	15	5.278 *
Writing presentation skills	13	7	2.443 NS	7	5	0.451 NS	13	10	0.555 NS
Communication with the reader	3	15	10.483 **	8	7	0.099 NS	5	12	3.686 NS
Other responses	3	4		4	3		5	3	
<b>My weaknesses</b>	<i>sample A</i>			<i>sample B</i>			<i>sample C</i>		
<i>Response Category</i>	<i>N = 38</i>		<i>significance P =</i>	<i>N = 23</i>		<i>significance P =</i>	<i>N = 39</i>		<i>significance P =</i>
	<i>stage 1</i>	<i>stage 16</i>		<i>stage 1</i>	<i>stage 16</i>		<i>stage 1</i>	<i>stage 16</i>	
Preparation for writing	2	8	2.235 NS	0	0	Not valid	2	2	0.000 NS
Content of writing	9	14	1.559 NS	8	8	0.000 NS	11	1	9.848 *
The writing process	3	5	0.559 NS	6	1	4.212 *	4	6	0.459 NS
Writing presentation skills	17	11	2.036 NS	6	12	3.286 NS	19	18	0.051 NS
Communication with the reader	13	6	3.439 NS	8	8	0.000 NS	15	10	1.272 NS
Other responses	0	4		3	0		2	2	

\*\* = significant at  $p < .01$  level    \* = significant at  $p < .05$  level    NS = not significant    ranks 1 and 2

The statistically significant differences were found more in the reported strengths than in the weaknesses. Also, the analysis indicated differences for all samples, though across a wider range of perceived strengths and weakness for the experimental samples than for the control sample. To examine for any clear trends, the response categories were ranked and those falling into the highest ranks are highlighted in Table 10.9. The rank order positions revealed some of differences between stages 1 and 16 in the ‘My strengths’ responses for the experimental samples, though not for the control sample. At stage 1 the highest ranking strengths were consistently “content of writing” and “writing presentation skills” (highlighted in Table 10.8). At stage 16 these had fallen below the highest ranked positions and had been replaced by “preparation for writing”, “the writing process” and “communication with the reader”. This suggested that a change had taken place in the



experimental-group students' metacognitive knowledge of themselves as writers. The change has been from a focus on task-related knowledge (content and presentation skills) to strategy or procedural knowledge (preparation, process and communication). This was seen as a significant change in the students' metacognitive model of writing.

Very little change had taken place in the 'My weaknesses' responses ranked at the highest positions

**Question 7. "Select from the 12 items in the list below, the six which you feel at the moment, to be the most important for writing in the two contexts given at the top of each column**  
**GRAMMAR WORDS & EXPRESSIONS REFLECTING SPELLING DISCUSSION**  
**DRAFTING CONTENT AUDIENCE SEQUENCE NEATNESS PLANNING IDEAS**  
**For me personally. For children I will be teaching."**

The analysis of the data obtained at stage 1 had found no significant difference between the three samples and no significant differences between the responses under the two conditions, "For me personally" and "For children I will be teaching". Analysis of the ranked positions of the 12 items had indicated some differences between the two conditions, however, and a factor analysis of the original data produced slightly different factors for students themselves as writers compared with their pupils as writers. When these findings were compared with the corresponding findings from stage 9, some changes were noted and these were examined in Chapter 7 and are summarised in Table 7.4.

At stage 16, the data from these two earlier stages have been re-analysed using the responses only from those students who responded at all three stages, 1, 9 and 16. The numbers of students involved and a summary of all the data collected are given Table 10.10.



**Table 10.10** Summary of responses for Question 7 at stage 1, stage 9 and stage 16

<i>For me personally</i>									
	<i>sample A (n = 38)</i>			<i>sample B (n = 23)</i>			<i>sample C (n = 39)</i>		
<i>Terms selected</i>	<i>stage 1</i>	<i>stage 9</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 9</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 9</i>	<i>stage 16</i>
spelling	13	9	7	6	10	6	15	7	10
grammar	16	19	15	12	14	8	25	10	20
neatness	7	1	1	2	3	1	11	1	1
words/expressions	9	11	12	14	7	9	14	5	14
ideas	14	14	23	10	7	9	20	12	12
content	29	28	31	18	20	20	27	20	34
reflecting	24	22	25	16	17	16	21	16	24
drafting	23	15	16	11	5	10	19	12	19
planning	24	26	30	16	15	19	33	21	35
discussing	10	10	7	3	5	9	9	5	10
audience	16	23	25	12	10	9	17	3	23
sequence	11	8	15	7	9	12	13	13	26
<i>For children I will be teaching</i>									
	<i>sample A (n = 38)</i>			<i>sample B (n = 23)</i>			<i>sample C (n = 39)</i>		
<i>Terms selected</i>	<i>stage 1</i>	<i>stage 9</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 9</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 9</i>	<i>stage 16</i>
spelling	24	24	19	21	10	12	27	16	20
grammar	19	20	20	16	12	14	16	16	20
neatness	17	12	12	7	17	1	12	9	5
words/expressions	28	19	19	11	11	11	31	17	30
ideas	24	24	27	15	14	14	29	16	24
content	12	15	16	13	14	16	28	8	23
reflecting	6	4	7	3	11	6	13	4	7
drafting	3	10	9	4	8	2	2	5	13
planning	15	18	27	9	16	12	13	14	30
discussing	21	18	15	14	8	14	29	7	17
audience	3	4	19	9	11	14	7	2	12
sequence	21	18	15	9	2	17	22	12	26

It was decided at stage 9 that the statistical analysis using chi-square to identify any significant differences between the stages for each sample might not indicate as much as an examination of the rank order positions of the selected terms. Because of this and due to the limitation of the chi-square test, it was decided not to apply the chi-square test to the data from the three stages, 1, 9 and 16. Instead, the rank order positions were determined and these given in Table 10.11 and have been used as the basis for further analysis.



**Table 10.11** Rank order of frequency of responses for Question 7 at stages 1, 9 and 16

<i>Samples A and C combined</i>						
	<i>For students themselves</i>			<i>For children they will teach</i>		
	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 16</i>	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 16</i>
First quartile	planning content reflecting	content planning reflecting	content planning reflecting	words ideas spelling	ideas spelling words	<b>planning</b> ideas words
Second quartile	drafting grammar ideas	grammar drafting ideas	sequence audience grammar	discussing sequence content	grammar planning sequence	sequence grammar spelling
Third quartile	audience spelling sequence	audience sequence spelling	ideas drafting words	grammar neatness <b>planning</b>	discussing content neatness	content discussing audience
Fourth quartile	words discussing neatness	words discussing neatness	spelling discussing neatness	reflecting audience drafting	drafting reflecting audience	drafting neatness reflecting
<i>Sample B</i>						
	<i>For students themselves</i>			<i>For children they will teach</i>		
	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 16</i>	<i>Stage 1</i>	<i>Stage 9</i>	<i>Stage 16</i>
First quartile	content planning reflecting	content reflecting planning	content planning <b>sequence</b>	<b>spelling</b> grammar ideas	<b>neatness</b> <b>planning</b> content	<b>sequence</b> content <b>audience</b>
Second quartile	words <b>grammar</b> audience	grammar <b>spelling</b> audience	reflecting <b>drafting</b> audience	discussing content words	ideas grammar <b>reflecting</b>	<b>discussing</b> ideas grammar
Third quartile	drafting ideas <b>sequence</b>	sequence words ideas	words ideas discussing	planning <b>audience</b> <b>sequence</b>	words audience spelling	<b>spelling</b> <b>planning</b> words
Fourth quartile	spelling discussing neatness	discussing <b>drafting</b> neatness	<b>grammar</b> <b>spelling</b> neatness	neatness drafting reflecting	drafting <b>discussing</b> sequence	<b>reflecting</b> drafting <b>neatness</b>

The arrangement of choices into quartiles shown in Table 10.11 indicated that the experimental samples had a notably consistent view of themselves as writers, with not a single term varying by more than one quartile position across all three stages of data collection. This was taken to indicate that they had a metacognitive model of writing from a personal writer perspective which was stable and consistent. The contrasting information for the control sample demonstrated a much less stable metacognitive model of writing from a personal perspective. Here, 4 terms had varied by more than one quartile position across the three stages, indicating a less well-established metacognitive awareness.

The quartile distribution of items for the students' pupils also indicates a substantially stable metacognitive model of writing, with the single exception of the position of "planning" which



steadily rises in its quartile position from stage 1 to stage 9 and then to stage 16. With the control sample the metacognitive model of writing in relation to their pupils is largely inconsistent across the three stages, with 7 terms varying by more than one quartile position.

It was interesting to note that at stage 1 all students in the experimental and control groups had indicated a similar model of writing for themselves and a further similar model for their pupils. Throughout the two years of this study, these models become stable and established with the experimental groups, but were apparently less stable with the control group. The detail of this variation across the stages is indicated in Table 10.11.

As at stage 1 and stage 9, a factor analysis was carried out on the responses given at stage 16 and the results for all three stages are given in Table 10.12. Factor analysis was undertaken on the individual responses given by each student in each of the samples and therefore it examined the data in a slightly different way compared with that carried out through the analyses of the clustered data presented in Tables 10.10 and 10.11. The factor analysis was taken to indicate underlying influences which might have contributed to how the students identified the terms given in question 7 as being important for writing.

**Table 10.12** Factors identified from factor analysis of question 7 responses at stages 1, 9 and 16

<i>Sample A and sample C (combined)</i>			<i>For students themselves</i>			
	<i>stage 1</i>		<i>stage 9</i>		<i>stage 16</i>	
	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>	<i>%age of variance</i>		<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>
Factor 1	14.808	grammar spelling	21.689	content discussion audience reflecting planning	13.741	grammar spelling
Factor 2	12.851	audience	19.982	panning ideas sequence content drafting words	11.762	drafting neatness
Factor 3	12.094	planning content ideas	16.609	grammar spelling neatness	11.414	content planning
Factor 4	11.286	sequence neatness			11.023	sequence



**Table 10.12** (continued)

<i>Sample A and sample C (combined)</i>			<i>For children they will teach.</i>			
	<i>stage 1</i>		<i>stage 9</i>		<i>stage 16</i>	
	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>
Factor 1	13.501	grammar spelling	22.467	words spelling sequence ideas neatness	14.667	drafting
Factor 2	13.299	planning reflecting	17.037	content sequence	13.850	words
Factor 3	12.062	audience content	14.593	grammar spelling	13.276	planning
Factor 4	11.928	content ideas words	12.637	discussion audience	11.860	content
<i>Sample B</i>						
			<i>For children they will teach.</i>			
	<i>stage 1</i>		<i>stage 9</i>		<i>stage 16</i>	
	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>
Factor 1	17.386	content audience	18.302	content words planning reflecting	16.632	content
Factor 2	15.019	planning	14.962	spelling grammar	15.985	discussion planning
Factor 3	14.844	drafting reflecting	14.631	discussion neatness	15.159	grammar spelling
Factor 4	13.127	grammar	13.188	content audience sequence	13.190	reflecting ideas
Factor 5	12.201	audience	12.986	ideas	13.089	drafting
<i>Sample B</i>						
			<i>For children they will teach.</i>			
	<i>stage 1</i>		<i>stage 9</i>		<i>stage 16</i>	
	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>	<i>%age of variance</i>	<i>Loadings of &gt;+0.5</i>
Factor 1	15.653	drafting ideas	16.485	spelling planning neatness	18.739	spelling ideas
Factor 2	14.349	grammar content	15.441	words drafting	14.909	audience discussion
Factor 3	14.323	spelling	12.602	reflecting	12.616	content sequence
Factor 4	14.270	discussion neatness	12.406	grammar content	12.534	words
Factor 5	13.673	sequence	11.102	discussion		

Extraction method: Principal Component Analysis  
Rotation method: Varimax with Kaiser Normalisation



It had been found earlier that the experimental samples had demonstrated a largely consistent model of metacognition across stages 1 and 9 and this was confirmed across the three stages, for the students' metacognitive model of themselves. There are two factors ("grammar and spelling" and "audience") which are common to both stages 1 and 16. The evidence relating to stage 9 for these students was a little less clear with the appearance of factors with up to 5 elements: such large numbers did not appear at any other stage. This might have indicated that, at the midpoint of the study, the experimental students had a substantially unclear metacognitive understanding of themselves as writers. There was also some indication of this lack of clarity from the analysis of the responses for the students' pupils, but to a lesser extent. By stage 16, however, the students appeared to have demonstrated a more focused awareness of their pupils' writing, as this is the only stage where the factors produced were all single item factors. This was taken to indicate a significant change in their metacognitive awareness of teaching writing in the classroom.

The findings from the control sample indicated, for the students themselves, no factors common to stage 1 and 16 though one was common to stages 9 and 16. The factors at stage 9 again tended to contain above-average numbers of terms. A similar position was found with the responses relating to the students' pupils and together, these findings suggested that the control sample did not demonstrate a particularly stable metacognitive model of writing.

It had been anticipated that the factor analyses of the students' responses might have helped to identify some aspects of the metacognitive model of writing which the students demonstrated at the three stages where question 7 had been asked. This interpretation of the factors utilised the structure for analysis used at stage 1 (explained in Chapter 4 and summarised in Table 4.2) where it had been suggested there might be four key aspects of writing, reflecting different elements of metacognitive knowledge. These four key aspects of writing were presentation, content, process and the writer and these have been matched with the appropriate form of metacognitive knowledge (task knowledge and procedural knowledge) as well as the 12 terms from question 7, as shown in Table 10.13.



**Table 10.13** The relationship between the items from question 7 and the key aspects of writing used at stage 1

<i>Key aspect of writing</i>	<i>Terms used in question 7</i>	<i>Form of metacognitive knowledge</i>
Presentation	grammar, spelling, neatness	Task knowledge (discourse)
Content	words, ideas, content	Task knowledge (content)
Process	planning, drafting, reflecting	Strategy knowledge
The writer	audience, sequence, discussion	Strategy knowledge

One significant finding was that for the experimental samples, factor 1 (contributing the largest percentage of variance) reflected task knowledge at both stage 1 and stage 16 for students themselves. When considering their pupils, factor 1 was task knowledge at stage 1 (“grammar/spelling”), but had changed to become strategy knowledge at stage 16 (“drafting”) for their pupils but not for themselves. The distribution of the remaining factor analyses findings in Table 10.12 indicated no clear pattern of change for either the experimental samples or the control sample at stage 1 and at stage 16. For both sets of samples, the factors found were related to task knowledge and strategy knowledge (or a combination of both forms of knowledge) in roughly equal proportions at both stage 1 and stage 16. A summary of the findings from question 7 is given in Table 10.14.

**Table 10.14** Changes from stage 1 to stage 16 indicated by analysis of quartile distributions and factor analysis for all samples

<b>Samples A and C</b>		
	<i>Differences between stage 1 and stage 16 in inter-quartile distribution</i>	<i>Differences between findings at stage 1 and stage 16 in factor analysis</i>
<i>For students themselves</i>	No items have changed substantially, suggesting largely stable model of metacognition	One factor common to both stages suggesting some stability to the metacognitive model
<i>For their pupils</i>	One item moved substantially, suggesting some change in metacognitive model	No common factors, all factors changed to single term factors suggesting changed metacognitive model
<b>Sample B</b>		
	<i>Differences between stage 1 and stage 16 in inter-quartile distribution</i>	<i>Differences between findings at stage 1 and stage 16 in factor analysis</i>
<i>For students themselves</i>	Two items moved substantially, suggesting considerable change in the metacognitive model	No common factors suggesting little stability of metacognitive model
<i>For their pupils</i>	Three items moved substantially, suggesting substantial change in the metacognitive model	No common factors suggesting little stability of metacognitive model



## Assessment of writing

A writing task to write two or three paragraphs on “The Importance of Writing” was part of the data collection instrument at stages 1, 9 and 16, but not all samples were involved on each occasion. Additionally, an assessment of the students’ writing was carried out at stage 7. The grades obtained at all stages are given in Table 10.15.

**Table 10.15** Numbers of students with different writing grades at stages 1, 7, 9 and 16

	<i>sample A</i>			<i>sample B</i>	<i>sample C</i>			
	<i>stage 7</i>	<i>stage 9</i>	<i>stage 16</i>	<i>stage 16</i>	<i>stage 1</i>	<i>stage 7</i>	<i>stage 9</i>	<i>stage 16</i>
<i>1 (lowest)</i>	1	3	5	1	5	4	2	3
<i>2</i>	4	9	7	3	16	5	10	6
<i>3</i>	11	10	10	7	9	6	7	7
<i>4</i>	10	9	11	4	5	9	10	10
<i>5 (highest)</i>	10	6	4	5	2	14	8	8
<i>Totals</i>	36	37	37	20	37	38	37	34
<i>Mean grade</i>	3.66	3.16	3.05	3.45	2.54	3.63	3.32	3.41

For samples A and C combined,  
stage 1 compared with stage 16

Chi-square = 10.882  
df = 4  
p = 0.029 \*

\* = significant at  $p < .05$  level

Not surprisingly, the mean grade at stage 1 was the lowest. The mean grades at stage 7 were higher than those at the later two stages, but they were based on a different (and longer) writing task, possibly indicating that the shorter task did not provide sufficient scope for higher grades to be awarded. There was an improvement from stage 9 to stage 16 but this was slight and not significant. There were insufficient data to permit a more searching statistical analysis of differences between the control sample and the experimental samples although the control group appeared to have a mean grade slightly in advance of one of the experimental groups. That these students were one year further into their course than the experimental groups, at the time of the stage 16 writing task, may have explained this.

Sample C was the only sample for whom there were data at all stages. A comparison between grades awarded at the beginning and at the end of the study (stage 1 and 16) indicated a statistically



significant difference. The prime cause of this difference appeared to be the disproportionately high number of students awarded a grade 2 at stage 1. The data, for all samples, relating to stages 1 and 16, have been clustered into lower-graded writers and higher-graded writers (Table 10.16) \and these indicate a general improvement in the measured writing performance across the two years of study with each sample.

**Table 10.16** Percentages of lower-graded writers and higher-graded writers at stages 1 and 16

	<i>Experimental samples</i>		<i>Control sample</i>
	<i>Stage 1</i>	<i>Stage 16</i>	<i>Stage 16</i>
<i>grades 1 +2</i>	56.7%	29.6%	20%
<i>grades 4 +5</i>	18.9%	46.5%	45%

The results from Table 10.16 together with a crosstabulation of writing grades for sample C (Table 10.17) indicated an improvement of 27% at both levels (fewer at grades 1 and 2, more at grades 4 and 5).

**Table 10.17** Crosstabulation of writing grades at stages 1 and 16 for sample C

	<i>Stage 16 writing grades</i>						
<i>Stage 1 writing grades</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>Total</i>	<i>changes</i>
<i>1</i>	0	0	2	2	0	4	4 grades up
<i>2</i>	1	3	5	2	3	14	10 grades up, 1 down
<i>3</i>	1	1	0	4	3	9	7 grades up, 1 down
<i>4</i>	1	2	0	1	1	5	1 grade up, 3 down
<i>5</i>	0	0	0	1	1	2	1 grade down
<i>Total</i>	3	6	7	10	8	34	

### Overall progression

To present an indication of an overall progression across the two years of the study, summary of the responses given at all stages of data collection by two students is given in Appendix 6. One student was graded as a poor writer at the beginning of the study (stage 1) and the other was graded as a good writer at the same stage. This summary illustrates, in two students of different writing abilities, both the differences in their apparent metacognitive awareness throughout this study, and the specific changes which were observed in each of them across the two-year period. For



example, the student who was the better writer tended to give fuller and more comprehensive responses (such as to most of the questions at stage 1, stage 4 and stage 16). There was also greater stability in the metacognitive model of personal writing for the better writer than for the poor writer from stage 1 to stage 16 (as indicated by question 7 at these stages). There were more changes in the metacognitive model of children's writing across the same period for the same student. There were fewer differences between these two students in their personal writer profile, with rather more obvious differences in their pupil writer profiles. The reported findings regarding regulation in writing in the classroom suggested that the better writer may have been a little more perceptive in her observations.

### **Discussion and conclusions from stages 15 and 16**

Stage 15 was intended to help the students see the links between the concepts and features associated with metacognition and the writing process which been taught over the preceding sessions. An awareness of these links would help to provide a more complete understanding of how metacognition and the teaching of writing were relevant to their professional development and therefore help them to understand a metacognitive approach to teaching writing in the classroom. The achievement of this was partially indicated by the students' suggestions of links between some of the elements given in Figure 10.1, additional to those given in the diagram. The indications were positive and suggested that the students were certainly aware of a 'bigger picture' of a theoretical background to metacognition and writing. It is likely that very few students, if any, had this awareness at the start of the study. A more complete indication of the students' gain would follow in the subsequent years of the students' BEd course and during their time as fully trained teachers. The collection of this latter evidence was beyond the scope of the present study.

The data collection at stage 16 was the final evidence for interpreting how the students had changed throughout the study. These changes were primarily in their metacognitive knowledge and their awareness of monitoring and control, and to a lesser extent how they might have improved their writing skills as a consequence.



### *Metacognitive knowledge*

A categorisation of the types of metacognitive knowledge which could be identified in each of the questions in the data collection instrument was proposed at stage 1 (see Table 4.15). This categorisation was taken to be relevant as a basis for summarising changes between stages 1 and 16 (summarised in Table 10.18).

**Table 10.18** Changes in the types of metacognitive knowledge indicated by a comparison of the findings from stage 1 and stage 16 for each question in the data collection instrument

	<i>Type of knowledge</i>	<i>Indication of knowledge or decisions based on knowledge</i>	<i>Differences between findings at stage 1 and stage 16</i>
Question 1	Task knowledge and strategy knowledge	Indication of knowledge	Increased levels of both types of knowledge appeared to exist for experimental samples but not for control sample
Question 2	Task knowledge and strategy knowledge	Indication of knowledge	Increased level for only one of the experimental samples and primarily in strategy knowledge
Question 3	Strategy knowledge	Indication of knowledge	More emphasis in regulation strategies than on text production skills by the experimental samples
Question 4	Strategy knowledge	Decisions based on knowledge	No significant changes were identified but evidence of a trend for enhanced awareness of control activities was found
Question 5	Task knowledge	Indication of knowledge	Experimental samples have become more focused in their views on relevant task knowledge
Question 6	Self knowledge	Indication of knowledge	Significant change reflected enhanced metacognitive self-knowledge
Question 7	Task knowledge	Decisions based on knowledge	Significant changes in relation to metacognitive model of writing relating pupils but not for students themselves

The overall picture is one of consistent changes (not always statistically significant) in the metacognitive knowledge of the students, between the two stages of the study. The changes have been observed in all the basic types of knowledge which are related to metacognitive awareness and taken together appeared to give a positive indication of the development of a metacognitive approach to writing. The students' knowledge was taken to reflect their metacognitive model of



writing and the conclusion from the data relating to knowledge was that there was evidence of the students beginning to take a metacognitive view of writing.

It was judged that the questions used at stage 1 and stage 16 fulfilled the function of reflecting a measure of metacognitive awareness better when taken together and that over-reliance should not be placed on the answers to any single question.

### *Monitoring and control*

The main indication of the students' awareness of monitoring and control was from the responses to question 4. The distinction between external and internal regulation had been identified at stage 1 as a possible difference between the predominance of responses categorised as "high level monitoring" or "low level monitoring". A potential change towards an increased reporting of internal regulation was not found in the responses at stage 16 and the conclusion was that no such change had taken place. A clear trend was identified suggesting that the experimental groups had progressed towards linking monitoring with control and this was a good indication of an improved metacognitive approach to writing.

The conclusion reached from the analysis of the data from question four was that without specifically asking for responses related to monitoring and to control, the students identified actions which were clearly categorisable as lying in these two areas. It was clear, therefore, that the students put into operation both monitoring and control skills as they attempted to improve their own writing. There appeared to be a progression towards more focus on control actions over a period of two years, though less indication of moving from lower level monitoring skills to higher level monitoring skills.

### *Writing*

The evidence was of improved writing performance over the period of this study, but this was also found to be true for the control group. It may be that the students did not undertake much writing apart from completing tasks and assignments for their course, and if this were true, the



improvement shown in the earlier years of the BEd course covered by this study might not continue in the long term. An influence of adopting a metacognitive approach to writing might be reflected more in how these students would teach writing rather than in their own writing.

### *General conclusions*

The data from question 7 were expected to indicate a more comprehensive view of students' metacognitive awareness, and to some extent it does that. The data give a clear indication that the students have measurable metacognitive knowledge, an awareness of metacognitive regulation, and an established and stable metacognitive model of writing as it relates to themselves.

Metacognitive knowledge has been indicated from the beginning of this study (stage 1) and during the course of the first year better writers were found to exhibit greater declarative knowledge than poorer writers. By the end of the study, metacognitive knowledge was reported more frequently and this finding was more evident in the experimental groups than in the control group.

.....Metacognitive regulation was not much in evidence at the beginning of this study and what evidence there was, related more to monitoring. There was measurably more evidence of regulation in the closing stages with greater reference to the control aspects by the experimental groups, but not by the control group.

Interpreting the findings relating to changes in metacognitive knowledge and an awareness of metacognitive regulation, the indication was that teacher education students can *adopt* a metacognitive view of writing, and can *adjust* their awareness of it, in relation to their pupils as well as with themselves. This was interpreted as the students having demonstrated a metacognitive model of writing for themselves and for their pupils. Further, their model of children's writing had developed and changed whereas that for themselves has remained remarkably stable. The evidence also indicated that the control group appeared not to have a consistent metacognitive model of



writing either for themselves or for their pupils, and the interpretation was that little development of a metacognitive understanding of writing had taken place with the control group.

As with the earlier stages in this study, the final teaching session and the final data collection session were expected to contribute to developing the students' understanding of metacognition in the teaching of writing. Together, the final two stages were expected to help the students to draw links between theory and practice and to understand each of these better. The content of the teaching was undoubtedly difficult and, by itself, the teaching about metacognition in this study may not have achieved as much as might have been preferred. The combination of teaching with practical activities (in the school classroom as well as in the lecture room) has served to better promote, than by teaching alone, an understanding of the complex area of metacognition in writing and its potential application in the teaching of writing.

.....Finally, the conclusion was that no single data collection stage indicated uniquely that a metacognitive model of writing can be promoted, identified and possibly measured. There was a firm belief that all the data collection stages, collectively and corroboratively, contributed to the evidence for a metacognitive model of writing. The open ended questions used at various stages throughout the study provided indications of the nature and content of metacognitive knowledge; the item-selection question used at the start and the end of the study provided a closer view of how task knowledge and strategy knowledge differ in their contributions to each model; and the writer profile provided insights on the process of regulation. All these contributions, when taken together rather than independently or separately, give a view of what might reasonably be taken to be a metacognitive model of writing. The data did not support a single measure of a metacognitive model but they do substantiate the conclusions of Winne and Perry (2000) and of Devine *et al* that examining the links between the models of metacognition and the models of writing are both worthwhile and possible.



## Summary

Stage 15 was a summary teaching stage attempting to bring together the ideas, concepts and models which had been introduced over the preceding two years. This teaching session also attempted to explain that the models of metacognition and the models of writing which had been previously described to the students, should not be considered separately from each other but that there existed opportunities for identifying meaningful links at both theoretical and practical levels between the two areas of metacognition and writing.

In the final stage of this study, stage 16, the baseline data collection instrument used at the beginning (stage 1) was re-administered to all samples. The findings from each of the questions were compared with the findings at stage 1 and in very nearly every case there was some difference between the responses at the two stages. These were often not statistically significant but the trends were clear. The differences and the trends supported changes towards a greater awareness of a metacognitive approach to writing as indicated in students metacognitive knowledge and in their reports on the monitoring and control aspects of regulation.

The conclusion was that the evidence from the data collection measure used at stage 16 should be taken in conjunction with that collected at the earlier stages to give a good indication that a metacognitive model of writing was reflected by information collected about metacognitive knowledge and metacognitive regulation. This information indicated that a metacognitive model of writing was identifiable and measurable and that for the experimental groups of students the model relating to themselves was stable and that the model relating to their pupils was changing. The evidence suggested that the control group had a very uncertain metacognitive model of writing for both themselves and their pupils.







# **Chapter 11**

## **Conclusions and Implications**

### **Introduction**

Much of the discussion of the findings which might normally be left to the end of a report such as this has been included in the preceding chapters, to help present a more complete picture of the stages as each developed. Some of the relationships which have been identified between the findings from this study and the literature have therefore already been presented in the concluding sections of the earlier chapters and the perspective adopted in this final chapter is of a more holistic view. The focus presented here is one which attempts to derive more reflective answers to the research questions by considering the empirical findings and their relationship within the wider perspective presented in the literature. Consequently, much of what is presented in this chapter is given both as conclusions and as an extension of the earlier discussions of the findings.

### **The research focus and the research questions**

The research focus for this study was stated as, “Metacognition and the teaching of writing – what



are the links between these two areas and how might they be developed to help promote a metacognitive approach to teaching writing?” The investigation of this was undertaken with teacher education students during the first two years of their four-year teacher education degree (BEd) course and five specific research questions were identified. What follows is an elaboration of the discussion begun in the earlier chapters and an indication of what might be some answers to these questions. For each question, a conclusion is drawn about how this study has identified some new insights and issues which need to continue to be addressed. Finally, a more general discussion about how this investigation has addressed the broader research focus is presented.

**Research question 1. How can metacognitive thinking in relation to writing be measured before and after a period of teaching about metacognition?**

The data collection instrument used at the beginning and at the end of this study was a new measure, compiled using the principles of metacognitive knowledge widely supported in the literature, but mainly proposed by Flavell (1979), Kluwe (1982, 1987) and Brown (1987). The instrument targeted self-knowledge, task-knowledge and strategy-knowledge (after Flavell, 1976), and included items related to regulation and its two basic components of monitoring and control, which are also widely accepted in the literature. The data collection instrument specifically targeted elements of knowledge and regulation in the realm of writing and to help achieve this, the structure of the questions followed some of the ideas used in an earlier writing-related study by Devine, Railey and Boshoff (1993). In this new instrument all the questions except one were subject to *post hoc* qualitative analysis and the responses were therefore subjected to a verification of the consistency of marker judgement. This produced reliability measures between 0.83 and 0.94 on the basis of two analyses, one year apart.

The evidence gathered in this study suggested that the students on entering a BEd teacher education course had distinctly different perceptions of themselves as writers and of the children to whom they would teach writing in the primary school. These perceptions embraced both



metacognitive knowledge and an awareness of metacognitive regulation, though the evidence in relation to regulation was initially less obvious.

Because of limited availability of other widely accepted measures of metacognition, it was difficult to assess accurately how much the basic measure, which was used at the beginning and at the end of the two year study, actually measured students' metacognitive knowledge or metacognitive skills in regulation. However, an instrument which permits respondents to indicate their knowledge about writing meets one criterion of at least one kind of metacognitive knowledge suggested by Bracewell (1983) and by Baker and Brown (1984), namely that such metacognitive knowledge should be *statable*. In making a statement about declarative knowledge, the respondents were involved in (metacognitively) structuring their cognitive knowledge, relevant to the questions asked. Thus the processes involved in making statements are indicative of a form of mental processing which is itself suggestive of metacognitive thinking.

Bracewell (1983) has argued that *stability* is another indicative criterion of metacognitive knowledge and would apply to both declarative knowledge and procedural knowledge. In the present study, the comparison of the responses to the questions in the data collection instrument used at stage 1 and stage 16 showed considerable stability for the experimental samples though not for the control sample. Stability in responses was found only when the experimental sample students referred to themselves as writers. There was a significant difference, between the beginning and the end of the study, for the responses from the same students when referring to their pupils.

In addition to assessing metacognitive knowledge, the instrument used at stage 1 and stage 16 also attempted to elicit student awareness of regulation in writing, where the evidence is likely to be found more as procedural knowledge than as declarative knowledge. The relationship between this categorisation of knowledge and the three types of knowledge proposed by Flavell (1976) was described in Chapter 2 where some of the more recent suggestions (Kuhn, 2000; Schneider and Lockl, 2002) were described and summarised in Table 2.1. For the base-line data collection



instrument devised for the present study, the relationship between strategy knowledge and procedural knowledge was seen as particularly relevant.

Strategy knowledge was specifically addressed in two of the questions of the instrument and the evidence from the students' responses gave a clear indication of some awareness of the monitoring and control elements of regulation. Further, analysis of the responses led to a discrimination between two levels of monitoring which were equated with externally directed regulation and internally directed regulation, originally proposed by Boekaerts (1999). The instrument allowed the students with sufficient self-awareness to indicate their procedural knowledge about regulation strategies. It was also able to detect some evidence for the balance between external regulation practices and internal regulation practices as well as for the balance between monitoring and control activities within regulation procedures. The findings indicated a shift in the monitoring/control balance between stages 1 and 16 as well as a small but noticeable shift in the balance between external and internal regulation.

Finally, a comparison was made of the components measured, with the list of components of metacognitive knowledge and metacognitive monitoring (taken to be representative of metacognitive regulation) suggested by Winne and Perry (2000) in their studies of different measurement instruments (see Table 2.5 in Chapter 2). Details are given in Table 11.1 for the questions used in the data collection instruments used at stages 1, 4 and 16 and these suggest that there is a good match with Winne and Perry's (2000) identified components.

The view from this study has been that no single data collection instrument has proved to be *by itself* a sufficient measure of metacognitive functioning in relation to writing. The view is that different measures can provide an indication of aspects of a metacognitive approach to writing, and that perhaps collectively they might reasonably be interpreted to suggest a more comprehensive *metacognitive model of writing*. The summaries presented in Table 11.1 would seem to support that the metacognitive knowledge aspects of the more comprehensive metacognitive model have been appropriately covered in the instruments examined.



**Table 11.1** Summary of components of metacognitive knowledge and regulation (after Winne and Perry, 2000) addressed at stages 1, 4, and 16

<i>Metacognitive knowledge</i>	<i>Questions used at stages 1 and 16</i>	<i>Questions used at stage 4</i>
Knowledge of fine-grained cognitive operations that comprise cognitive tasks	Question 5, knowledge of writing-related concepts Question 7, importance of writing-related features	Question 1b, knowledge of the writing task
Knowledge about strategies that articulate cognitive tactics	Question 3, procedures for producing a piece of writing Question 6, assessing personal strengths as weakness as a writer	Question 1a, understanding the writing task
Procedural knowledge that enacts cognitive tactics	Question 3, procedures for producing a piece of writing	Questions 2a and 2b, most appropriate way to write and
Conditional knowledge about occasions to enact cognitive tasks	Question 1, awareness of good writing Question 2, awareness of a good writer	Question 3c, 3d and 3e, clarifying knowledge, deciding what to include and on structure
Knowledge of tasks parameters (such as resources or standards for success)	Question 4, how to improve a piece of writing Question 7, importance of writing-related features	Question 3a, knowledge used in deciding writing content
Knowledge of self parameters (such as, interest and effort)	Question 6, assessing personal strengths as weakness as a writer	Question 3b, awareness of own ideas
<i>Metacognitive monitoring (taken to be representative of metacognitive regulation)</i>		
Difficulty in addressing the task (ease of learning)		
Match of achievement to standards (judgements of learning)		Question 3f, monitoring progress
Probability of retrieval from long-term memory (feeling of knowing)		
Confidence about the accuracy of monitoring		Questions 1c and 2c, accuracy of understanding and decisions

It was concluded that the new baseline measure included questions which were able to assess students' metacognitive knowledge in relation to writing and to offer a range of cover which relates well to other suggestions in the literature. The consistency of responses across the two years of the study indicated an acceptable level of reliability. The measure was also successful in indicating metacognitive awareness of regulation and in particular demonstrated that different levels of regulation could be detected. It was therefore possible to identify students' awareness of monitoring and control and the balance between these in regulation procedures. If the new measure



were to be extended to include some of the questions used at stage 4, a combined instrument for measuring metacognition in relation to writing appears to be a worthwhile addition to those presently reported. The evidence obtained from the measures used at stages 1, 4 and 16 supported a conclusion that the students had a different *metacognitive model of writing* with regard to themselves as writers compared with what they considered to be an appropriate metacognitive model of writing for their pupils. Although the evidence from this study was not taken as conclusive, there is sufficient corroboration to suggest that the combination of measures created may be used again (with some modification) in further experimental examination of the identification and measurement of a metacognitive model of writing.

**Research question 2. To what extent does the ‘metacognitive cycle’ model proposed by Nelson and Narens (1990) indicate an appropriate approach for teaching the monitoring and control aspects of metacognition in relation to writing?**

As a part of the first teaching stage in the study, and before the Nelson and Narens (1990, 1994) model of metacognition had been introduced to the students, an introduction was given to the concept of monitoring and control of learning. In a subsequent data collection stage (stage 4), the students were asked specific questions about how they evaluated their progress when completing a writing task and the results indicated that the students had poorly developed ideas about these concepts. This was possibly part of the explanation for the finding that only a small minority of students appeared to be aware that effective monitoring was associated with control or modifying actions in the course of writing. At this early stage, the term “regulation” had not been introduced.

When the Nelson and Narens model of metacognition was introduced to the students (at stage 8), an elaboration of the monitoring and control stages was given in much more detail than had been suggested in the original literature (Nelson and Narens, 1990). This elaboration was achieved by suggesting the questions and ideas which could be used to implement monitoring and control activities in a writing context. This proved to be a difficult teaching session for both experimental



groups and many of the students clearly had problems in integrating the ideas of monitoring and control into their understanding of the writing process. The Nelson and Narens (1990) model of metacognition was again explained at stage 10 where the shift of focus was from the students themselves as writers to their view of themselves as teachers of writing.

The subsequent data collection and teaching sessions were expected to help the students to consolidate their learning about regulation during writing. In particular, the later teaching session about regulation (stage 13) centred on the students' understanding of regulation (monitoring and control) at a more practical level and the focus of much of the teaching was on how it might be possible to promote and recognise regulatory activities while teaching writing in the classroom. Like the earlier teaching sessions about the Nelson and Narens (1990) model of metacognition, this later session also proved to be a difficult learning experience for many students. However, some evidence from the final data collection session did suggest a change in awareness of control activities alongside monitoring activities.

The data collection session which was the most likely to reflect changes in the students' assimilation of the Nelson and Narens model of metacognition was stage 16 where comparisons could be made with the responses to the same questions at stage 1. Responses to question 4 at these two stages were not significantly different but trends were identified indicating a greater awareness of control in the experimental samples but not in the control sample. This was interpreted as suggesting an increased metacognitive awareness and the students who had indicated this were predominantly those who were better writers at stage 16. As the change was not statistically significant, this finding would have to be verified with more extensive research.

The evidence (in Chapter 6) suggested that there were some of the better writers who did have a grasp of at least the relationships between monitoring and control. Conversely, it was found that many of the students who had difficulty with the concepts associated with regulation were those who had the lower writing grades.



The conclusion was that the area of regulation in writing was a complex one for the students to comprehend and that the Nelson and Narens (1990, 1994) model may not have clarified this difficult area for all students. For some, a poor understanding of the underlying theoretical model of metacognition may not have helped them to examine the monitoring and control aspects of metacognition in relation to writing and it appeared that these students were the ones with poorer writing grades. For better writers, the Nelson and Narens (1994) model of metacognition may have been an appropriate teaching model of the monitoring and control aspects of metacognition in relation to writing. However, it could be argued that the poorer writers were those who were most in need of a better understanding of these matters and who would benefit most from learning about an appropriate model. Further research is required to find out more about what influences an appropriate approach to teaching them about a model of regulation in metacognition.

**Research question 3. Does the model of writing proposed by Hayes (1996) provide a meaningful and suitable basis for an examination of writers' perceptions of the writing process?**

The Hayes (1996) model was selected as the model of writing around which most of the teaching about the theoretical constructs associated with writing would be given. It was selected as it matched well with the evidence taken from the students' own responses about their engagement in writing and therefore could be promoted to the students as a model with which they might more easily relate.

The use of the Hayes model to produce a profile of a writer was a new application of the model and this was promoted to help the students examine closely the model of writing in the context, initially of themselves as writers, and subsequently of their pupils as writers. This was seen as practical application of the model which could be implemented rapidly and easily, compared with an attempt to interpret the model over a longer period of time in the context of a developing understanding of the process of teaching writing in the classroom.



The teaching of the model turned out to be difficult, and it was clear that students had little previous experience of theoretical models in their earlier teaching. Partly this was evident in the student engagement in the creation of a profile of a writer. Some students seemed to find this so difficult that they avoided attempting to complete it, either for themselves or for their pupils. This suggests either the model was not suitable or the level of understanding of some students was not sufficiently developed to use the model.

For the students who were able to produce a profile of a writer, the products gave a good indication of students' different perceptions of themselves as writers and of their pupils as writers. The use of the five categories in the writer profile permitted a close examination of some of the key contributing elements of the writing process and highlighted the perceived importance of cognitive processes and long term memory for themselves as writers, and of the social and emotional factors for their pupils as writers. This was an important contribution to the students' ability to discriminate between "beginning" (or "novice") writers and "mature" (or "expert") writers and it was significant that the students were able to discover this through application of a theoretical model.

When the students were introduced to the concept of a writer profile, they suggested that they might be able to identify the profiles of 'good' and 'poor' writers. The reason for this was clearly to find out what elements of the profile might have been influential in promoting 'good writers' so that they might get some indications for self-improvement. It was encouraging, therefore, to find that there were discernible differences in some categories of the personal writer profile between better and poorer writers. As these differences were not found to be statistically significant, further development and use of the writer profile would be required.

The conclusion was, on balance, that the Hayes (1996) model of writing provided an appropriate basis for examining student perceptions of writing and, with some development, could prove to be



a useful contribution to promoting student insight into the writing process helping to identify those in need of support to become better writers.

**Research question 4. How does the promotion of a metacognitive approach to writing help students to develop their understanding of teaching writing in the primary school particularly with regard to novice and expert models of writing and regulation in writing?**

Helping the students to be able to see the importance of adopting a metacognitive approach to the teaching of writing was the central feature of this study. The difficulties in achieving this were twofold. First, the concepts involved in teaching about metacognition, and its role in the promotion of learning at a personal level, were difficult and demanding. Most students had not experienced the ideas of thinking about thinking, and of executive control of their own learning, in their education to date. In addition, there were probably not many other taught elements of the BEd course which made such focused cognitive demands on the students within the first two years of their course. Therefore, the students' own learning about metacognition was, for most of them, likely to have been difficult and some students may have made relatively insubstantial gains in knowledge and understanding about the topic.

The second difficulty was in being able to apply, in the practice of their teaching in the classroom, aspects of metacognition as it related to the teaching of writing. The students were in the first half of their four-year course during this study and, for many, their experiences in the classroom will have been demanding, sometimes daunting and occasionally confusing. To apply metacognition in practice was an extra load, not normally part of their course, and may have been looked on, by many, as of lower priority and lesser significance, particularly if it were difficult.

In promoting a metacognitive approach to writing, the regular themes which had been highlighted throughout the teaching and data collection stages of this study were two-fold. Firstly, the focus of the students' thinking changed, from themselves as writers, to their perception of



writing in the classroom. Secondly, metacognitive thinking covered two main aspects of mental activity, metacognitive knowledge and metacognitive regulation (monitoring and control).

The evidence throughout the study suggested that the students had coped with the first of these themes and that they had frequently and easily been able to transfer from thinking about themselves as writer to thinking about their pupils. In the course of adopting these two perspectives, the students had been able to identify and clarify some important differences between the two groups of writers. The evidence from stage one indicated that many students already had some understanding of the differences between themselves and their pupils and this was expanded and extended during the subsequent teaching sessions, where the differences were explained under the headings of “expert” and “novice” writers.

As the teaching about metacognitive thinking in relation to writing progressed through this study, students’ learning was sampled through the various data collection stages. In addition to the evidence for enhanced metacognitive thinking *per se* (as indicated above under research question 1), there was clear evidence that the students were able discriminate between the two groups of writers increasingly successfully. For example, the analysis of the objective question in the initial, mid-point and final data indicated poorly developed initial awarenesses of the two types of writer improving by the end of the study.

The students’ gain from completing a writer profile for themselves and for their pupils was seen as particularly beneficial through providing first hand information about how they thought children perceived the writing process. The information collected provided students with insights into how children learn to write. The reported differences between the two writer profiles were taken to indicate that the students had been able to discriminate significantly between their own writing and that of their pupils. Although not empirically verified at this stage how much of that ability was based on their metacognitive understanding of the writing process, it seemed a reasonable assumption that the students were attempting to use their metacognitive understanding of their own writing to understand the teaching of writing in the classroom.



In relationship to the second theme throughout this study, of metacognitive knowledge and metacognitive regulation, there was some indication that metacognitive knowledge was linked with the students' own writing ability. Students who were graded as better writers exhibited slightly different knowledge from their colleagues who were graded as poorer writers. Overall, the comparison of the higher scoring writers with their lower scoring colleagues suggested that their metacognitive knowledge about their own writing was more detailed and that this was more obviously so in their declarative metacognitive knowledge than in their procedural metacognitive knowledge (indicated in Chapter 6).

In the verification of potential student gains in metacognitive knowledge and regulation, the latter is perhaps the aspect of metacognitive thinking where an outcome may be more readily recognised, and therefore to attempt to observe regulation in practice appeared to be well justified for the present study. Support for this view is found in Son and Schwartz (2002) who suggested that monitoring and control are currently the most studied issue in metacognition. In their studies, Son and Schwartz identified what they called "states of knowledge", namely: what the learner knows now; what the learner does not know; and what the learner does not know but does know how to work it out. The main function of metacognition was identified as permitting learners to make decisions about these states of their knowledge. In the teaching sessions about metacognitive regulation in the present study, it was emphasised that states of knowledge such these suggested by Son and Schwartz were the core features of metacognitive regulation.

The confusions relating to the use of the terms "regulation", self-regulation", "monitoring" and "control" have been referred to in Chapter 2. This was a potential difficulty and it was decided that the least complicated approach be used where "regulation" was taken to include "monitoring" and "control", and "self-regulation" was related to internal-regulation only. A second possible difficulty was the approach adopted of considering regulation in writing from specific perspectives (social, physical, motivational, and cognitive). Asking the students to examine these areas for evidence of regulation in writing was intended to make the data collection easier as they were areas



the students had already targeted for the writer profile. The chosen areas may not have been the most obvious to the teachers with whom the students were working. However, there was support in the literature for these areas, such as from Graham and Harris (1998, 2000) who quoted the importance of the writing environment for the promotion of physical self-regulation strategies of professional writers. Graham and Harris gave examples of professional authors who laid considerable store by the provision of the correct physical resources to permit writing to take place, including in such resources the selection of a location, a time in the day and the use of special routines before starting to write. They quoted evidence suggesting that upwards of 45% of skilled writers' time is spent on regulation. Graham and Harris (2000) also report evidence of a high level of regulation by skilled student writers in social self-regulation through activities such as using think-aloud protocols during writing in peer groups. Evidence of cognitive regulation was also found in activities such as examining goals, structuring writing and overcoming difficulties. As there were apparently no reported studies examining these features of writing with primary school children, this is an important area for further research.

The students' understanding of differences between novice and expert writers was an important part of their metacognitive awareness of the teaching of writing. The evidence from this study suggested that they had begun to identify and clarify these differences. This was the source of a third potential difficulty. When students collected data about regulation in writing, they were in classes in rural schools where children in the same class would not be of the same age and could range over as much as seven years. Consequently, most students would have worked with children where some were novice writers and others would be substantially more skilled, occasionally exhibiting some characteristics of expert writers. This meant that many students had to cope with attempting to consolidate their learning about regulation in a practical setting at the same time as consolidating their learning about expert and novice writers.

There was a fourth and unexpected difficulty. In the majority of classrooms visited by the students, class teachers appeared to have demonstrated little awareness of regulation in writing and accordingly devoted little attention to teaching regulation strategies to children. Although the



evidence collected was very limited, this finding appeared to relate to children from P1 classes to P7 classes and probably for all areas of the curriculum. Understandably, students found it difficult to observe examples of regulation in practice when it was frequently not taught to the children by their teachers.

The conclusion was that teaching about a metacognitive approach to writing had helped the students to clarify and extend their understanding of novice and experts writers and had helped them to develop their perspectives about some of the relevant features of young writers in the classroom. The practical application of a pupil writer profile seemed to be particularly helpful in developing students' insights into children's learning about writing. Other concepts associated with regulation, however, were more difficult to assimilate. Partly because of that and partly due to limited instances of teachers giving much attention to teaching regulation strategies, students seemed to gain initially only limited awareness of regulation in children's writing. The unscheduled data collection two years after the final session of this study, using one of the experimental samples, provided evidence of a clearer picture of increased student confidence in their knowledge of regulation in teaching writing.

#### **Research question 5. How might certain models of metacognition and of writing be elaborated in terms of a single composite model?**

During the course of this study the basic model of metacognition presented was that metacognitive thinking comprised two elements; metacognitive knowledge, and metacognitive monitoring and control. The structure of metacognitive knowledge was presented in terms of the proposals for declarative, procedural and conditional knowledge (after Brown, 1978, 1980, 1981, 1987; Flavell, 1976, 1979, 1987; and Paris, Lipson and Wixson, 1983) and of task-knowledge, person-knowledge and strategy-knowledge (after Flavell, 1987; Flavell, Miller and Miller, 1993). The explanation of metacognitive monitoring and control was given in the context of the Nelson and Narens (1990,



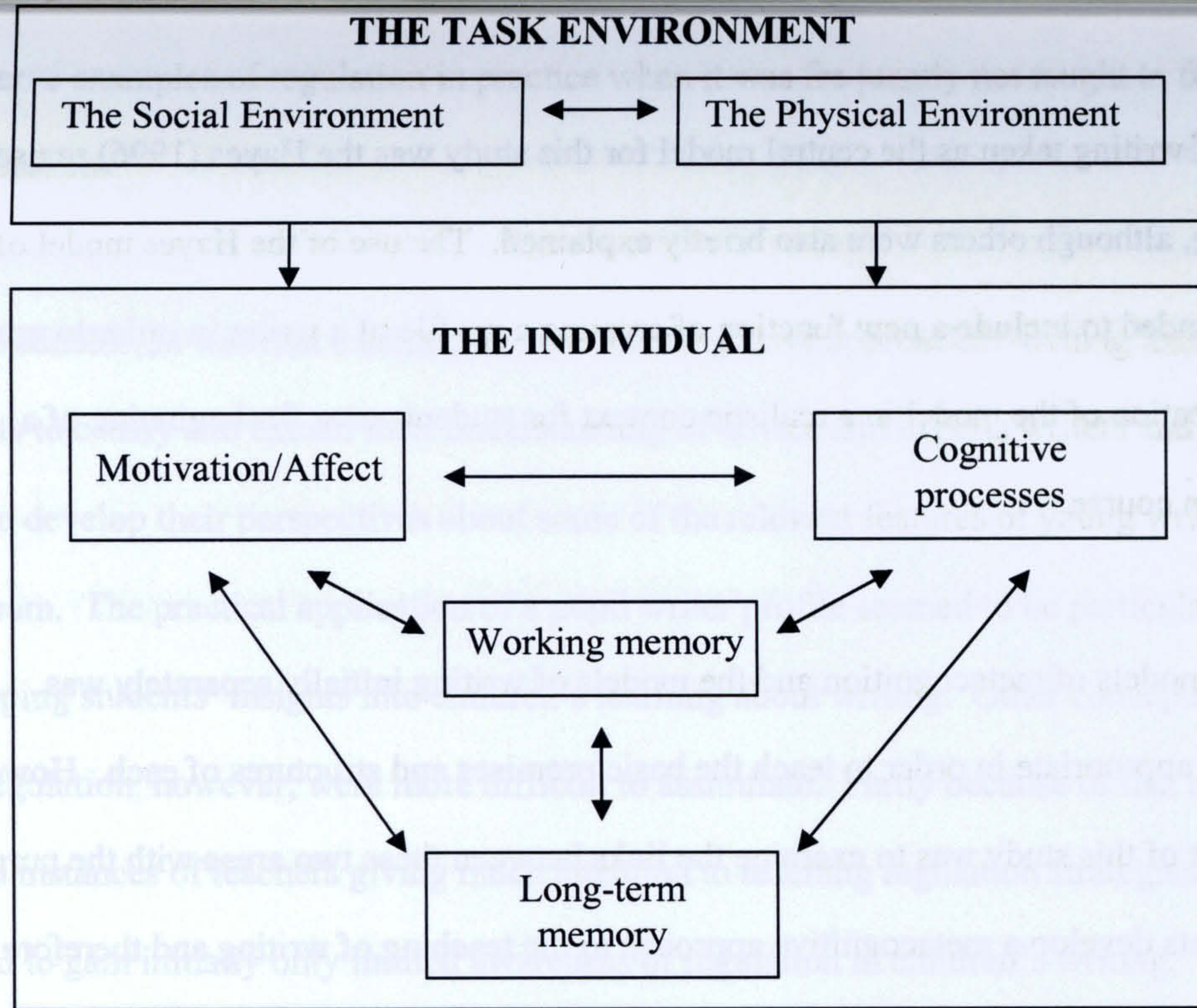
1994) cyclical model of linking an object level with a meta-level of performance through the processes of monitoring and control.

The model of writing taken as the central model for this study was the Hayes (1996) revised model of writing, although others were also briefly explained. The use of the Hayes model of writing was extended to include a new function of creating a profile of a writer in order to provide a practical application of the model in a realistic context for students near the beginning of a teacher education course.

Treating the models of metacognition and the models of writing initially separately was considered to be appropriate in order to teach the basic premises and structures of each. However, the general thrust of this study was to examine the links between these two areas with the purpose of helping students develop a metacognitive approach to the teaching of writing and therefore ways of identifying such links were essential to its success. The answer to research question 5 was derived separately from the teaching and data collection sessions with the students. Although the task of assisting students to see the links might be more successful if a combined model of metacognition and writing were already available, it was judged that the difficulties many students had experienced during the teaching of the theories separately indicated potentially greater difficulties for the new combined model. Significantly, there has been no such attempt reported in the literature to date. Consequently, the present derivation of a composite model was undertaken separately from the empirical data gathering with the samples.

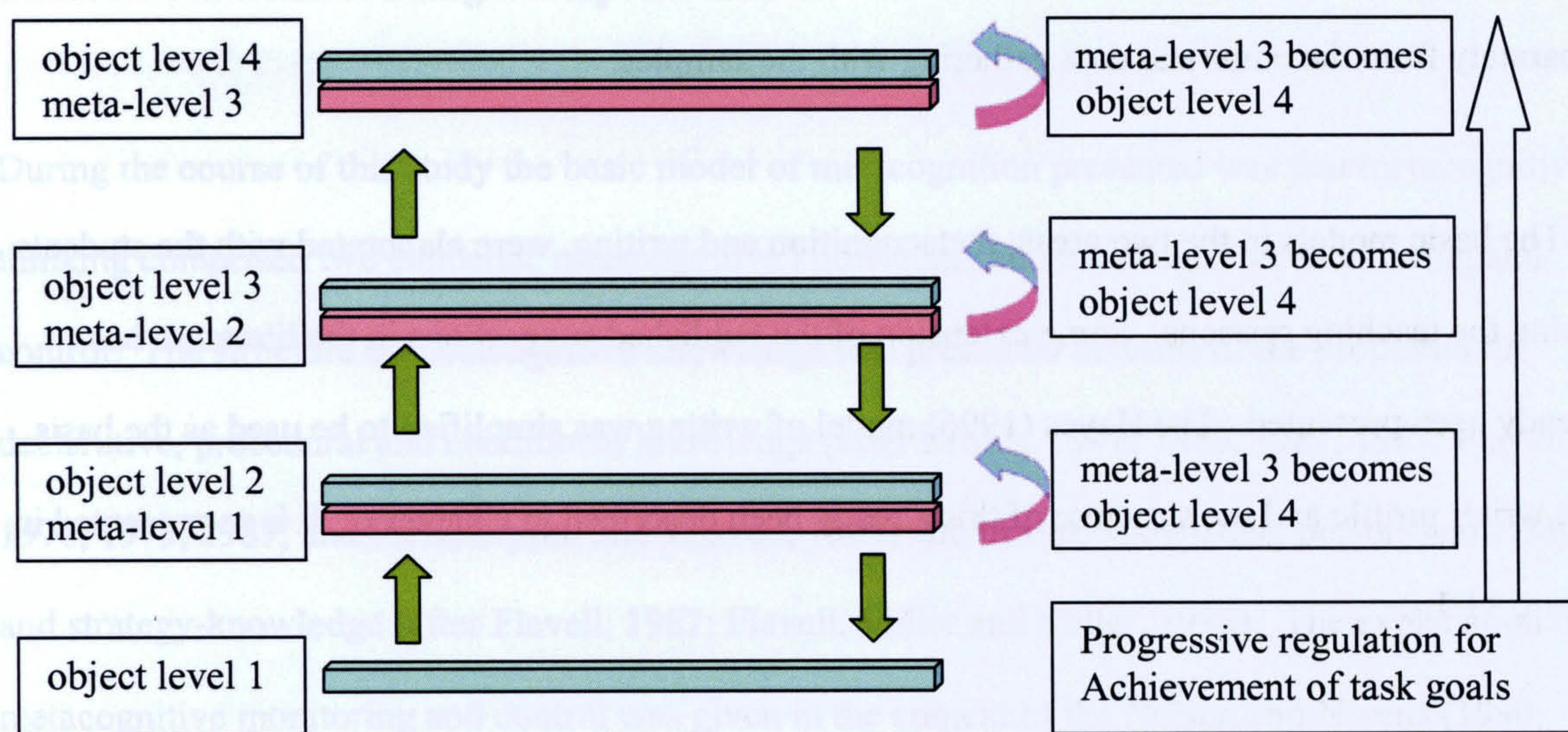
The basic models in the two areas, metacognition and writing, were elaborated with the students during the teaching sessions. Some extension of the published suggestions in the literature has already been presented. The Hayes (1996) model of writing was simplified to be used as the basis of a writer profile and the structure of this already been described in Chapter 6. It is re-presented in Figure 11.1.





The presentation of the Nelson and Narens (1994) model of metacognition was described in Chapter 7 and the original authors' suggestion that the basic cyclical model should be understood as a spiral process was given in the diagrammatic form which is re-presented in Figure 11.2.

**Figure 11.2** Model of metacognitive regulation (based on Nelson and Narens, 1994)



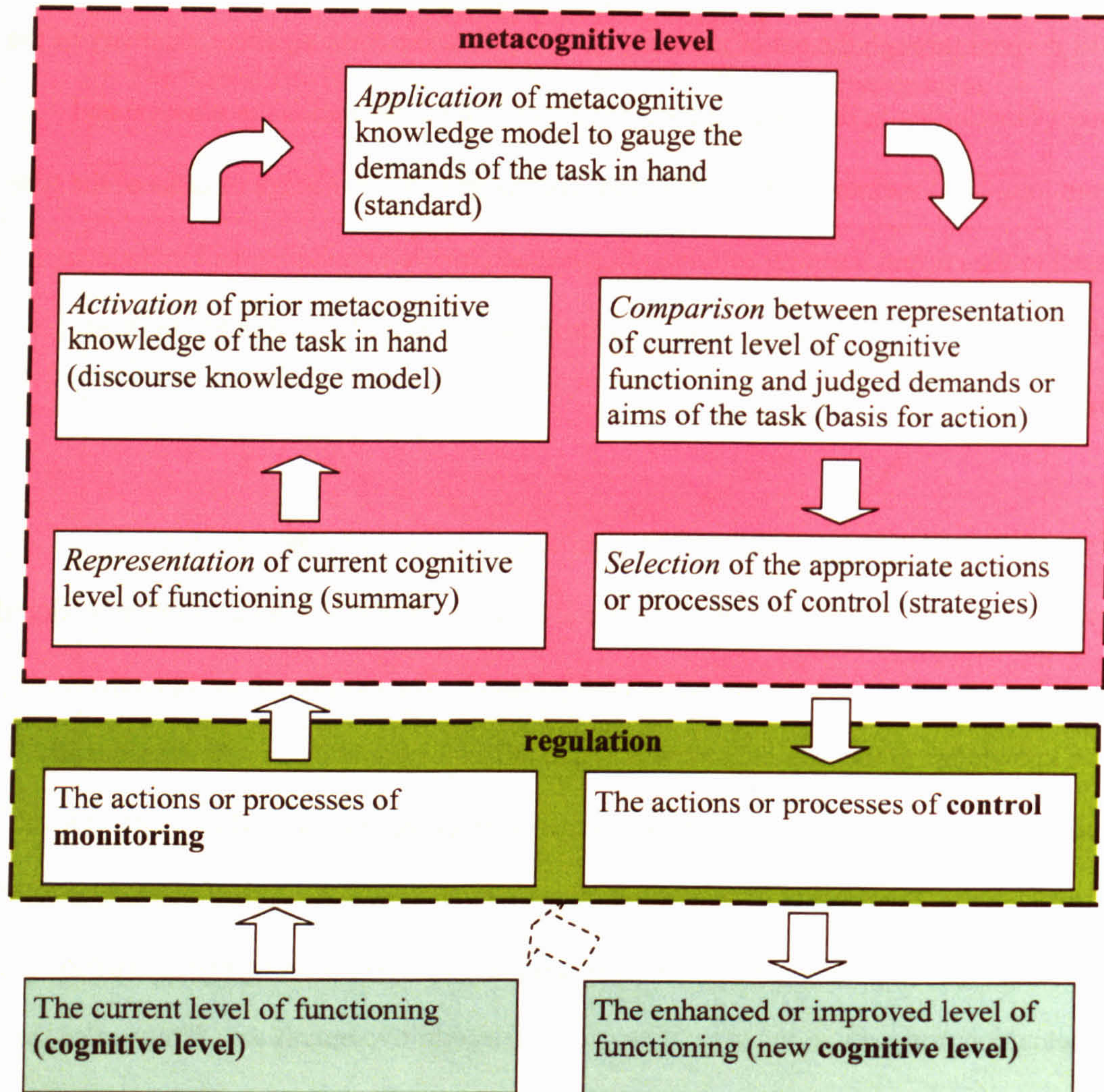


It seemed likely that the meta-level in the Nelson and Narens model could comprise several elements. Five are now proposed. First is the metacognitive selection or *representation* of the cognitive level derived through the act of monitoring, to produce the metacognitive summary of the learner's current functioning in the learning task (see Figure 11.3). Second is the retrieval and *activation* from long-term memory of the appropriate metacognitive knowledge of tasks of the type being addressed in the current learning activity. This metacognitive knowledge will include an awareness of the task goals and will consist of the learner's prior knowledge specific to other relevant learning tasks.

In the terms of Flavell's (1976) model of metacognition, this would be the learner's metacognitive self-knowledge and task-knowledge and thus an individual's metacognitive model of the learning associated with each task will differ appropriately. The *application* of this prior metacognitive knowledge to the task in hand will be the third element and this will subsequently derive a standard against which the learner must compare the representation of the cognitive level (the first element) during the process of regulation. Such *comparison* is itself the fourth element of the meta-level and provides a basis for subsequent action. Success in this element will lead to decisions about action or no action in terms of possible metacognitive operations. This is also the element within the meta-level where the iterative process of regulation will cease when it is judged that achievement of the learning task is complete with no further control action required. It is the *selection* of these actions and procedures which is the fifth element, and this will allow the learner to change appropriate elements of the learning activity to produce an enhanced level of functioning. This final element also corresponds to Flavell's suggestion of metacognitive strategy-knowledge. The proposed new composite view is presented in Figure 11.3.



**Figure 11.3** Proposed elaborated structure of Nelson and Narens (1994) model of metacognitive regulation



Within this proposed elaboration of the Nelson and Nelson model of metacognitive regulation, the object level has been renamed the cognitive level; monitoring and control lie within the regulation area; and the meta-level has been relabelled the (expanded) metacognitive level. The relationship with the spiral nature of the ongoing process of regulation where the meta-level may become a subsequent object level (Figure 11.2), is indicated in the elaborated model by the cognitive level achieving a higher status *through* the metacognitive level to become an enhanced cognitive level. Thus the object level exists initially as a (current) cognitive level and becomes an improved cognitive level with the subsequent progression to achieving the goals of the task through iterative regulation (as suggested via the dotted-line arrow in Figure 11.3) until the learner has completely achieved the goals or is satisfied that no further regulatory action is possible or required.



Many of the elements of the structure suggested in Figure 11.3 have already been the subject of research which has suggested that there is overlap between them. This would make the boundaries between some of the elements less distinct than Figure 11.3 might suggest. For example, studies of the processes which operate during monitoring (*outside* and preceding the meta-level in the original model) include widely reported work by Nelson and Narens (1990) on judgements of knowing. These studies suggested that monitoring rested significantly on the learner's awareness of the intended learning outcome and in having a (metacognitive) plan to achieve that goal (two elements which are placed *within* the metacognitive level in the proposed elaborated model). Nelson and Narens (1990) suggested that once learners were aware of these two prior features, they were able to make a series of judgements about the levels of mastery required for the learning and then to identify the strategies to help attain them such mastery.

In the derivation of the proposed elaboration of the Nelson and Narens model, the 'common ground' with others models and proposals has been considered. For the example, the first three elements of the Carver and Scheier (1998) model (described in Chapter 2, and shown in Figure 2.2), namely "input", "reference value" and "comparator" are taken to relate well with the *representation*, *activation* and *application* elements of the metacognitive level in Figure 11.3. In the Boekaerts (1999) model (shown in Figure 2.6), a three-part structure of regulation in learning involves regulation through cognitive strategies, through metacognitive knowledge, and through the motivational and emotional aspects of the self. The implementation of cognitive strategies is included in the proposed elaborated model in the final element of the metacognitive level; metacognitive knowledge occurs within the second and third elements; and the motivational and emotional aspects are subsumed under the achievement of an enhanced level of functioning at a new cognitive level.

Zimmerman's (2000) model of self-regulation argued for a three-way relationship between behavioural self-regulation, environmental self-regulation and personal self-regulation. The behavioural regulation aspects relate closely to the discourse knowledge element and the strategies



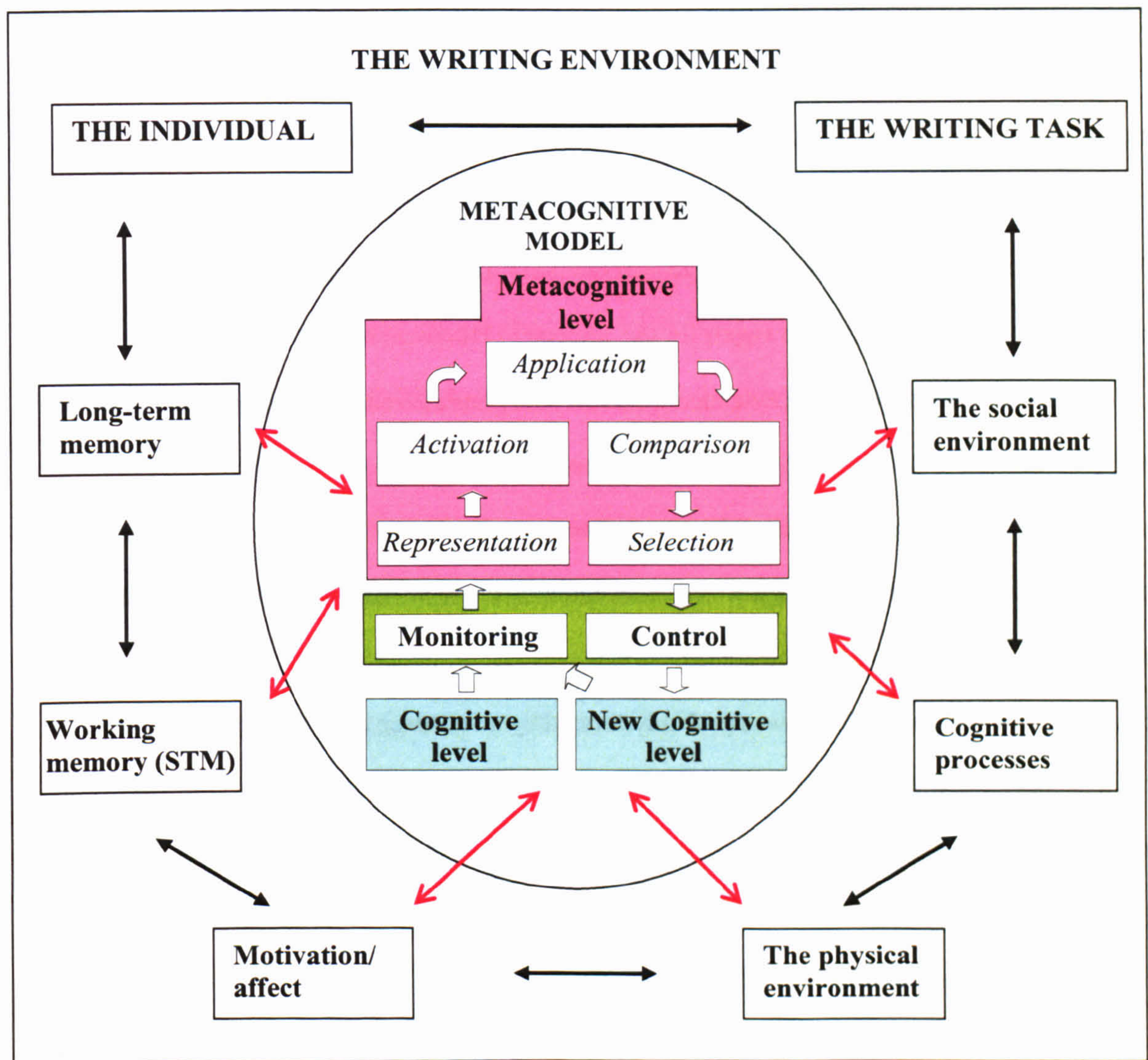
element in Figure 11.3. Environmental regulation was seen as closely linked with control activities particularly where these included learners' modelling of successful learning practices of others. Personal regulation (self-regulation) was associated with the motivation and emotional aspects identified by Boekaerts, as shown in the achievement of improving levels of cognitive functioning.

In Hayes' description of his revised model there is no mention of linking it with a metacognitive approach to writing (Hayes, 1996). Also, in recent interpretations of either Hayes and Flower's original (1980) model or of the revised (1996) model has there been no overt attempt to identify links between the writing model(s) with a model of metacognition (Zimmermann, 2000; Wang and Wen, 2002). These recent interpretations have proposed some helpful elaboration of the Hayes model or of the Hayes and Flower model, but in the area of more detailed descriptions of the relationships between the models' internal elements.

From the present study, it was clear that the elements of the Hayes (1996) model of writing related to very similar areas of regulation in a model of metacognition and in particular could be identified within the expanded model of metacognition suggested above. Both short-term memory and long-term memory are particularly involved at the metacognitive level of the proposed new model. Cognitive processes and the social environment make a significant contribution to the final stages of the metacognitive level and to the subsequent control activities. The physical environment and motivation for learning influence, and are influenced by, the achievement of a new cognitive level within the continuing process of moving towards a satisfactory achievement of the goals of the writing task. These links are shown in Figure 11.4 where an outline of a possible composite model is presented. Many other links also exist but for clarity have not been included in Figure 11.4.



**Figure 11.4** A possible composite model of metacognition and writing



In the outline model given in Figure 11.4 the elements of a writing model are presented around the periphery and a metacognitive model is at the centre or core of a complex (but over-simply presented) set of interactions indicated by the open-headed arrows. In the Hayes (1996) model of writing there are two-way interactions between most of the elements (Figure 11.1) and this has been assumed in the suggested composite model though it is represented (for diagrammatic clarity) by a reduced set indicators (closed-head arrows). In the composite model, writing involves metacognitive knowledge and metacognitive regulation and the arrows from the centre segment outwards are intended to reflect the most prominent metacognitive influences on the individual elements of the writing model. These selected and indicated in Figure 11.4 are not intended to be exclusive but rather indicative of some of the findings from the present study.



For example, it was found that the influence of the social environment of a writing context (particularly when this involved sharing with others) was particularly prominent in the comparison element of the metacognitive level of the metacognitive model; long-term memory was regularly recognised as playing a significant role in the activation of discourse knowledge about the relevant writing task; and motivation was a substantial contributor to the establishment and maintenance of work practices (such as drafting) for the achievement of a final and finished product.

At the more general level, the evidence from this study has also shown that regulation has both internally derived and externally derived influences, indicated by the students' reported actions as they worked on writing tasks. The difference between these two sets of influence was found to be associated with a higher level or a lower level of thinking about writing, taken as an indicator of a better or a poorer metacognitive awareness. There was also evidence of regulation in the primary school classrooms, although this was probably limited by an absence of focused teaching. These findings provide some confirmation that it is possible to collect evidence of metacognitive influences on writing and that the theoretical models of writing and metacognition are sufficiently inter-related to be of value for studying and promoting a metacognitive approach to writing.

The conclusion is that a composite model of a metacognitive approach to writing is possible and that it can relate to observable elements of the practice of writing. When a model such as that proposed above appears justified at a theoretical level, it must be the next step to show that it can apply at a practical level. There seems to be some evidence from this study that the Hayes (1996) model of writing, when adapted to reflect a profile of a writer, is understood by many teacher education students. The proposed composite model in Figure 11.4 uses a slightly different adaptation of the Hayes model of writing and its acceptability at a practical level has still to be tested. The expectation must be that if teacher education students are able to understand this further adaptation of the Hayes model of writing and are able to identify the close links with the model of regulation through monitoring and control, as presented in the composite model, they might be supported in developing their own understanding of a metacognitive approach to writing. This also has yet to be tested.



**The research focus. “Metacognition and the teaching of writing – what are the links between these two areas and how might they be developed to help promote a metacognitive approach to teaching writing?”**

One way of expressing the promotion of a metacognitive approach to teaching writing might be the identification of a metacognitive model of writing. At all stages throughout this study there have been attempts to examine actual and potential links between metacognitive awareness (‘thinking about thinking’ and awareness of skills and procedures) and teaching writing, and it was believed that collectively these might be related to and indicative of a metacognitive model of writing. In the earliest teaching sessions, students’ metacognitive knowledge about writing was directly related to a writing task, where perhaps the students may still have seen themselves as learners rather than as potential teachers. Slightly later, the teaching indicated how metacognitive knowledge of the writing process might link with the key elements of a writing model (Hayes’ revised model, 1996). This developed into a profile of a writer which arguably provides a new metacognitive awareness of the writer. The outcomes from these sessions indicated to the students that what they knew about themselves as writers and what they were able to report about writing tasks, were aspects of metacognitive knowledge which were directly linked with writing. From both the teaching and the data collection sessions it was therefore possible to link metacognitive knowledge with writing, initially from the perspective of a writer and subsequently in the context of teaching writing to children.

The role of short-term working memory and how this influenced the development of writing skills for novice writers and expert writers, was one of the more difficult links and may have been understood by only a minority of the students. This was probably partly due to their very limited awareness of the nature and function of memory in learning. There are certainly well established links between memory and knowledge transmission or knowledge transformation and it seems logical to include this within the wider goal of linking metacognition and the teaching of writing. The students’ understanding of these links would certainly seem to be worth elaborating and this



might be achieved through a more substantial teaching programme about memory and learning more generally, which was found to be lacking in the BEd course during the present study.

Teaching about regulation as a part of promoting an association between metacognition and the teaching of writing was one of the later focuses in this study, although it was also included in much of the earlier data collection. The students in this study were aware, from the early stages, of the need to review their own progress with writing tasks and they showed an unexpected reliance on peer group consultation for this purpose. There was an observable progression in the thinking of many students from reliance on peers towards self-reliance, but it remained as a major element in the regulation activities for their pupils in the classroom. With regard to students and teachers these observations fit well with a Vygotskian perspective of learning (Vygotsky (1978). The teaching of the theory of metacognitive regulation was therefore based on the assumption that many students already had some awareness of certain aspects of regulation in practice. The teaching and students' learning proved difficult, however, and it was clear that many students had not thought deeply about some of the more complex associated concepts of regulation. Linking the teaching about regulation with practical applications to teaching writing in the classroom was also one of the more difficult stages in this study. It was found that this was in part due to a substantial absence of teaching children about regulation in the context of writing in most classrooms.

At the theoretical level, this study attempted to explore the place of regulation as a central concept in a model of metacognition and in a model of writing. Bringing together the ideas, concepts and terminology common to the theories of metacognition and theories of writing, seemed to be worthwhile and an appropriate consequence of the aims of this study. There appears to be no previously report in the literature of this attempted combination. The composite model presented above is therefore a first attempt to establish links between the constructs of metacognition and a theory of writing, and although this more developed version of the model was not presented to the students, it does appear, from the evidence gathered from the data collection sessions of this study, to be sustainable.



The links suggested in Figure 11.4 are the most obvious from the data collection associated with this study. Other links undoubtedly exist and will be identified and supported through other studies. The format of the composite model will also be subject to extension or modification as the formation of such links becomes clearer and more fully established.

The conclusion of this study is that existence of links between theory and models of metacognition and writing can be supported both at a theoretical level and through some of the evidence of students' knowledge and understanding of metacognition and of the writing process. Throughout the teaching and data collection sessions of this study, one of the more influential factors was found to be the general state of readiness of the students to be able to comprehend some complex theoretical considerations. Students who had some knowledge of the basic concepts and principles were able to benefit more readily from the presentation of new ideas and theories. This was most obvious in relation to areas such as; social and cognitive approaches to learning, expert and novice writers, and monitoring and control. Much greater difficulty in grasping these concepts was experienced by the students who lacked the initial knowledge, understanding or experience in thinking about writing. The consequence of this has been that the development of links between metacognition and the teaching of writing to promote a metacognitive approach to writing were more successful with some students than with others in the present study.

The general research question embedded within the research focus has been answered as far as this investigation has allowed. Links between metacognition and teaching writing have been identified and the potential for others has been proposed. The support which these have provided in helping to promote a metacognitive approach to teaching writing has been observed in the development of the metacognitive model of writing by all students and particularly those who were initially more advanced in their knowledge about writing (and often in their own writing skills). Extension of this development to make it more successful for all students now requires a close examination of the circumstances which can lead to a more widely effective promotion of a metacognitive model to writing.



## Evaluation of the design of this study

The overall design of this study had some key features of which the most prominent were,

- the use of alternate teaching and data collection sessions extending across a two year period
- the devising and testing of instruments to indicate or measure a metacognitive model of writing
- a recurring focus on regulation and self-regulation as one indicator of metacognitive functioning
- the implementation of an intervention structure as a part of an existing course on the teaching of writing

Each of these is now examined critically with some suggestions for future improvement.

Teaching about metacognition is undoubtedly a complex subject and for students who may have had limited experience in comprehending the concepts associated with cognition, teaching about metacognition was certain to be particularly difficult. Partly to address that difficulty, the term “metacognition” was introduced only at the end of the first year of this two-year study. That did not reduce the difficulty of the content of the teaching sessions, however, and the ideas associated with regulation (monitoring and control), a theoretical model of writing, and the concept of a profile of a writer (all covered in the first year of the study) remained demanding for many of the students. The *alternation of teaching sessions* with data collection sessions was chosen to attempt to support the students’ learning with practical applications of thinking about (reflecting on) the more theoretical ideas and concepts introduced. However, the learning demand increased in the second year of the study, where new ideas were introduced covering attention and memory, the relationship between short-term memory and long-term memory, expert and novice writers, and regulation. The learning associated with some of these teaching sessions was certainly difficult for many of the students.



It was not clear if the data collection sessions had made coping with the theory much easier for many students. What appeared to be at least as successful was the teaching method used when presenting new material to the students. Each teaching session was interactive and attempted knowledge transformation rather than knowledge transmission. This was attempted (and probably achieved) by the integration of substantial discussion during teaching. In this way the students were encouraged to express their views, their understandings and their difficulties, as the teaching session progressed. The major problem associated with this approach was that the constraint of time. Teaching involving discussion is substantially more time-consuming than lecturing and in this study it resulted in over-crowded teaching sessions, particularly when these sessions had been relinquished by colleagues in the Language Studies Department from their own teaching programme. There was strong feeling that the teaching programme would have been better to have been either contained within its own programme or to have covered a longer time element of the language and writing programme.

.....In addition to the teaching sessions of this study, the data collection instruments were central aspect of the *examination of a metacognitive model* of writing and in particular if it could be assessed empirically. The results from all the data collection stages should be taken together to evaluate this aspect of the design of this study. From the outset it appeared that it would be insufficient to devise and implement a single instrument to examine the complex concept associated with this study and this has been confirmed. The data collected does not provide a single 'measure' of a metacognitive model of writing. It is arguably not possible to provide such a measure in absolute terms and comparisons between learners' perceived metacognitive models might be a more valuable way to examine their contribution to understanding the teaching of writing.

In previously reported research, the measurement of metacognition in writing has not attempted to measure metacognitive knowledge and metacognitive regulation as they might together provide an indication of a metacognitive model of writing. The present study has perhaps made some progress in showing that the measurement of these two features of metacognitive functioning,



metacognitive knowledge and metacognitive regulation, can lead to an interpretation which might be indicative of a metacognitive model of writing. The position is by no means clear, however, that the complex nature of a metacognitive model of writing can permit it to be 'assessed' by any empirical measure. Attempts at integrating measures of metacognitive knowledge with measures of metacognitive regulation offers some hope but not yet all the answers and clearly more creative work is still required in the area.

The recurring focus on the *metacognitive function of regulation* was not apparent to the students at the beginning of the study. However, they did appear to become more aware of the control aspects of regulation as the study progressed. This made the unexpected finding that regulation was not widely practiced or taught in the primary classroom, particularly disappointing.

From the additional unscheduled data collection when the students were in the final year of the BEd, it was reported that the students were trying to teach some of the skills of self-regulation in writing, despite there being little change in the teaching approaches of established teachers. This was the finding from students who had been taught about metacognition and regulation as a part of this study and it must be anticipated that if more teacher education students become informed about metacognition and more are able to adopt a metacognitive approach to the teaching of writing in the classroom, the greater should be the effect in the classroom. One possible advantage of that might be an increased interest of serving teachers in the field of metacognition and, in particular, in the functions of regulation in teaching their pupils to write.

The focus on regulation and self-regulation was believed to appropriate. It was also felt that it should be apparent at every stage in this study although the more formal teaching about the associated theories and concepts was given near the end of the two years. With the current position in primary schools, this was probably the most suitable arrangement and the conclusion was that continued teaching about metacognition and writing should influence classroom practices more widely. This should happen both directly as students work with teachers during their training periods in schools and ultimately when these students become teachers in their own right. The



resultant value for the children in the classroom must be continued development of regulation in writing across primary school classrooms, to the expected benefit of all pupil writers. This outcome might be achieved if the BEd course as a whole adopted an approach which included the teaching of a more metacognitive and self-regulatory approach to learning.

The context within which this study was implemented was the BEd course on language and writing and it was substantially an *intervention in their learning* for the promotion of a new understanding of the teaching of writing. The teaching sessions of this study were therefore presented in the timetabled class meetings of the language and writing course, alongside the remainder of that course, which was more practically oriented and was aimed at developing students' own writing skills in preparation for them teaching writing in the primary school. This arrangement was planned to promote a development of student insight and awareness of a metacognitive approach to writing alongside a course about personal writing and how to teach writing in the classroom. It was anticipated that students learning about the practical aspects of teaching writing in the classroom would cope better with learning the theory associated with metacognition and writing.

In discussion with the students during the teaching sessions and from the evidence gathered at the data collection sessions it was clear that the features which might have helped the students with some of the difficulties associated with learning demanding new concepts were at least twofold. Firstly, the students who were able to demonstrate some understanding of the ideas and theories from the earliest sessions, continued to do so through to the last. In short, it seemed that the more the students already knew, the more they were able to benefit from the teaching and the practical sessions of this study. The success of these students probably lay as much in their advanced prior knowledge, as in the arrangement of teaching about metacognition within a course on writing. Through the discursive approach to the teaching sessions, it was noted that there were repeated indications of the same students experiencing success with the teaching sessions and those having difficulty with their learning. Through adopting a discursive approach to the teaching sessions, it was possible to identify many aspects of students' prior knowledge and experience and thereby to



implement knowledge transformation, making learning more specifically focussed on learners' needs. These sessions indicated that there was greater success in teaching about theories of thinking and of writing when the students already had secure ideas about models of learning. It became very clear that if a larger proportion of students were to gain more from teaching about a metacognitive approach to writing, the teaching should be arranged after these students have personally progressed further with their prior study of the theory of learning (including memory in learning).

The second influencing factor appeared to be the standard of the students' own writing and of their successful writing experience. Although the measurement of students' own writing occupied only a small part of this study there were clear signs that those who were better writers at the start of the study generally maintained their good personal standard through to the end and, as indicated in the example given in Appendix 6, may also have had a more comprehensive understanding of the teaching about metacognition. Of the poorer writers, many improved, but not necessarily due to the teaching given during this study. Overall there was lower level of apparent understanding and depth of thinking at all stages of this study from the students who were the poorer writers.

Consideration of these factors leads to the view that the first two years of 4-year degree course might not be the best time to teach about adopting a metacognitive approach to writing. It might be more appropriate to delay this teaching until the last two years of a 4-year course. This would have the benefit of allowing students to have greater experience in attempting to understand the theory of learning and the additional benefit of allowing further experience of the teaching of writing in the primary classroom to support the students' learning about a metacognitive model of writing, both their own and that of their pupils in the classroom.

The other consideration which became clear in this study was relevance of arranging the teaching sessions and the data collection activities within the framework of a course on teaching writing in the classroom. This was successful for only some students while for others it appeared



to be merely an extra burden; to learn and practise the procedures for teaching writing at the same time as learning about adopting a metacognitive approach to writing.

The conclusion was that the importance of promoting a metacognitive approach to learning (in any curricular area) is arguably too great to permit its teaching and implementation to be added to an existing course as a further teaching element. Because of the arrangements in this study, the relevance of the teaching about a metacognitive approach to writing was subsumed within the greater importance of the 'parent' course on language and writing. To have had greater significance to the students, it might have been better to be timetabled as a separate course. Perhaps even more valuable would be a structured programme of teaching about adopting a metacognitive approach covering all aspects of a BEd course. If this were presented progressively through the majority of the four years of the course, the integration of students' learning about learning (including memory in learning) could be constructively developed to lead to the adoption of a self-regulatory approach in all aspects of learning. In this manner, progressive learning over a longer period of time, and not tied into a single curriculum area, could be structured to encourage the development of appropriate teaching and learning environments. In a teacher education course these may be attuned to the encouragement of interactive and practical teaching which should lead students being able to relate their metacognitive understanding of the learning process to their teaching of pupils in the classroom. This clearly applies to all curriculum areas, not solely the teaching of writing.

### **Contributions to the body of knowledge**

The study reported here is not a replication of any other so far reported in the literature and therefore its findings should make a contribution to the research evidence relevant to future attempts to draw links between metacognition and the teaching of writing. At a theoretical level it is not difficult to see where there might be common ground between the current theoretical understanding of the two fields. At a practical level of teaching towards an understanding and use



of the links, this study has demonstrated some of the difficulties in achieving successful teaching, under the circumstances which prevailed during its implementation. These findings suggest what to avoid in other studies and what to alter in any future similar studies, such as the arrangements for teaching about metacognition and in the need for multifaceted measurements of metacognition.

At the theoretical level, the description of a composite model suggested above is an early version of what might be developed into a useful way of helping to represent some of the conceptual links between the theories of metacognition and models of writing. The proposed model is simple in its structure and shows only a restricted view of how selected aspects of the two fields might be considered from a linked perspective. The suggested composite model and the elements which it comprises need further to scrutiny, and probably alteration and elaboration. The proposal from this study is a first step in the development of what could be a worthwhile contribution to teaching and learning about metacognition and writing, and so to the development of teaching and writing skills.

At the practical level, the suggested modification of the Hayes (1996) model of writing for the creation of a profile of a writer is also an advance beyond what is reported in the literature. Its potential contribution to understanding the process of writing, from a self-analytical perspective, potentially has some value for developing writers, such as in identifying the salient and relevant features of a personal view of writing. The use of a value accorded to each element of a writer profile (of 1, 2 or 3 in the present study), compared with the comments given, should be explored in greater depth. It would probably also be helpful to establish a more comprehensive set of guidelines for completing a writer profile. The contribution of a writer profile for identifying possible strengths and weaknesses in writing and in teaching writing might be more helpful if there were a more extensive baseline of appropriate information about a range of users. This information is not presently available. There is also scope for considering the elements which comprise the profile and, in particular, to consider the inclusion of working memory as one of the profile elements.



The instruments devised in this study for measuring metacognition have been new, though some were based on the earlier work on Devine *et al* (1993). The findings have suggested that the measurement of metacognition might best not be dependent on a single measure but rather on a combination of indicators. It has also been shown that the concept of a metacognitive model of writing might be an inclusive concept which relates to metacognitive knowledge and an awareness of metacognitive regulation. Taking the evidence from the writer profile in conjunction with the results from the other metacognitive measures used in this study, there is very clear evidence that student teachers have a different metacognitive model of writing for themselves and for their pupils. This does not appear to have been previously reported in the literature.

### **Recommendations for future research**

The research focus of this study remains a relevant area for research and it seems that the conditions for investigating the links between metacognition and the teaching of writing should continue to be reappraised. The circumstances surrounding the teaching given to students about metacognition will vary across many university courses and this variation is likely to exist also in the courses for teacher education students. Notwithstanding, there are possibly circumstances within the arrangements for such courses which might permit teaching about metacognition to be closely related to other relevant taught areas, such as memory and attention, regulation and self-regulation. An analysis of such co-ordinated teaching arrangements is worth a closer study and could be related to how students are supported in developing their understanding of the complex relationships about metacognition in practice, through related teaching of, for example, memory and learning. Similarly, teaching about metacognition in the context of the pedagogy of children's writing is likely to be possible and appropriate in many, if not all, teacher education courses and the conditions for such teaching should be explored in greater depth. For instance, the location within a four-year course has been identified by this study as a priority for further scrutiny. Others areas might include the balance between theory and practice relating to teaching writing in the primary school, the nature of teaching methods used with students, and the structure of teaching



programmes to ensure adequate coverage of the topic. The different views of the nature of metacognition and evidence for it, is also an area worthy of further study.

At a more specific level, the evidence from this study has suggested some areas where there appears to be uncertainty or lack of knowledge. These included: the uncertain aspects of students' participation in peer-group consultation for reviewing their own writing; the relationship between students' cognitive knowledge and their metacognitive knowledge and how they progress from one to the other; and why there appears to be little-classroom based teaching of regulation skills in relation to writing. The use of the Hayes (1996) model of writing as the basis for a profile of a writer might also have a contribution to make in awareness raising and helping learners to examine more closely their perceptions of themselves as writers. Further studies seem appropriate for developing the writer profile into a more accessible instrument within a context of understanding the writing process from a personal viewpoint.

The proposal from this study relating to a combined model of metacognition and writing is at an elementary stage and should be examined more thoroughly at both theoretical and practical levels. A composite model could have significant value in assisting students (and teachers) to integrate the theoretical and practical aspects of teaching writing. It should also predict at least some of the relevant phenomena of teaching writing in the classroom (such as the influence of the age or experience of the developing writer, or of influences external to the writer). None of these has yet been fully tested and each probably merits further study. The central role of regulation within a composite model is of special importance as it was found in this study to be poorly understood and practiced in schools. Self-regulated learning, in particular its role in the relationship between external regulation and internal regulation, appears to be an expectation within various courses at all levels in education, yet many learners (and many teachers) do not have a clear understanding of what is involved. This seems to be a valuable and crucial area for further research.

Finally, the structure of the composite model displayed in Figure 11.4 requires to be examined more closely and subjected to further rigorous scrutiny. This should include development of



different formats of presentation. With a better understanding of a composite model of metacognition and writing students (and teachers) might be more effectively supported in promoting a metacognitive approach to teaching writing.







## References

- Alamargot, D. & Chanquoy, L. (2001). *Through the Models of Writing*. Dordrecht, The Netherlands: Kluwer Academic Publishers
- Allal, L. (1993). Text transformations as an indicator of self-regulation in writing. Paper presented at the Annual meeting of the American Educational Research Association, Atlanta.
- Allen B.A. & Armour-Thomas, E. (1993). Construct validation of metacognition. *Journal of Psychology*, 127, 203 - 211.
- Anderson, J.R. (1983). *The architecture of cognition*. Cambridge, MA: Harvard University Press.
- Applebee, A.N. (2000). Alternative Models of Writing Development. In R. Indrisano & R. Squire (Eds.), *Writing: Research/Theory/Practice*. Newark DE: International Reading Association.
- Archer, J. (1998). Turning motivation into self regulation. Paper presented at the Annual meeting of the Australian Association for Research in Education, Adelaide.
- Ausubel, D.P. (1963). *The psychology of meaningful verbal learning*. New York: Grune & Stratton.
- Azevedo, R., Guthrie, J.T. & Seibert, D. (2004). The Role of Self-Regulated Learning in Fostering Students' Conceptual Understanding of Complex Systems with Hypermedia. *Educational Computing Research*, 30, 1 & 2, 87 - 111.
- Baddeley, A.D. (1986). *Working Memory*. Oxford: Oxford University Press.
- Baker, L. & Brown, A.L. (1984). Metacognitive skills and reading. In P.D. Pearson (Ed.), *Handbook of reading research*. New York: Longman.
- Bauers, A & Nicholls, J. (1986). Early Writing. In A. Wilkinson (Ed.). *The Writing of Writing*. Milton Keynes: Open University Press.
- Bereiter, C. (1980). Development in writing. In L.W. Glaser & E.R. Steinberg (Eds.), *Cognitive Processes in Writing*. Hillsdale, NJ: Lawrence Erlbaum.
- Bereiter, C. & Scardamalia, M. (1987). *The Psychology of Written Composition*. Hillsdale, NJ: Lawrence Erlbaum.



- Berninger, V.W. & Swanson, H.L. (1994). Modifying Hayes and Flower's model of skilled writing to explain beginning and developing writing. In E. Butterfield (Ed.), *Children's writing: Toward a process theory of development of skilled writing* (pp 31 - 56). Greenwich, CT: JAI Press.
- Boekaerts, M. (1999). Self-regulated learning: where we are today. *International Journal of Educational Research*, 31, 445 - 457.
- Bonds, C.W., Bonds, L.G. & Peach, W. (1992). Metacognition: Developing Independence in Learning. *Clearing House*, 66, 1, 56 - 59.
- Bourdin, B. & Fayol, M. (1994). Is written language production more difficult than oral language production? A working memory approach. *International Journal of Psychology*, 29, 591 - 620.
- Bracewell, R. (1983). Investigating the control of writing skills. In P. Mosenthal, L. Tamor & S.A. Walmsley (Eds.), *Research on writing: Principles and method*. (pp 177 - 203). New York: Longman.
- Brenna, B.A. (1995). The metacognitive reading strategies of five early readers. *Journal of Research in Reading*, 18, 1, 53 - 62.
- Britton, J.N., Burgess, T., Martin, N., McLeod, A. & Rosen, H. (1975). *The development of writing abilities (11 - 18)*. London: Macmillan Educational for the Schools Council.
- Brown, A.L. (1978). Knowing when, where and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instructional psychology*. Hillsdale, NJ: Lawrence Erlbaum.
- Brown, A. (1980). Metacognitive Development and Reading. In R.J. Spiro, B.C. Bruce & W.F. Brewer (Eds.), *Theoretical Issues in Reading Comprehension*. Hillsdale, NJ: Lawrence Erlbaum.
- Brown, A. L. (1981). Metacognition: The Development of Selective Attention Strategies for Learning from Texts. In M. Kamil (Ed.), *Directions in Reading: Research and Instruction*. Washington, DC: The National Reading Conference.
- Brown, A. (1987). Metacognition, Executive Control, Self-Regulation, and Other More Mysterious Mechanisms. In F.E. Weinert, and R.H. Kluwe (Eds.), *Metacognition, Motivation and Understanding*. (pp 65 - 116). Hillsdale, NJ: Lawrence Erlbaum.
- Brown, A. L. (1988). Motivation To Learn and Understand: On Taking Charge of One's Own Learning. *Cognition and Instruction*, 5, 4, 311 - 322.
- Brown, A.L., Palincsar, A.S. & Armbruster, B.B. (1984). Instructing comprehension-fostering activities in interactive learning situations. In H. Mandl, N.L. Stein & T. Trabasso (Eds.), *Learning and Comprehension of Text* (pp 255 - 286). Mahwah, NJ: Lawrence Erlbaum.
- Bruce, B., Collins, A., Rubins, A.D. & Gentner, D. (1982). Three perspectives on writing. *Educational Psychologist*, 17, 131-145.
- Butterfield, E.C., Albertson, L.R. & Johnston, J.C. (1995). On making cognitive theory more general and developmentally pertinent. In F. Weinert & W. Schneider (Eds.), *Memory Performance and Competencies: Issues in Growth and Development* (pp 181 - 205). Hillsdale, NJ: Lawrence Erlbaum.
- Cairney, J. & Munro, N. (1999). Teachers' heart isn't in writing. *Times Educational Supplement Scotland*, 7 May. 6.
- Campione, J.C. (1987). Metacognitive Components of Instructional Research with Problem Learners. In F.E. Weinert, and R.H. Kluwe (Eds.), *Metacognition, Motivation and Understanding*. Hillsdale, NJ: Lawrence Erlbaum.



- Carver, C.S. & Scheier, M.F. (1998). *On the Self-Regulation of Behaviour*. Cambridge: Cambridge University Press.
- Carver, C.S. & Scheier, M.F. (2000). On the Structure of Behavioural Self-Regulation. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of Self-Regulation* (pp 41 - 84). San Diego, CA: Academic Press.
- Case, R. (1980a). The Underlying Mechanism of Intellectual Development. In J.R.Kirby & J.B.Biggs (Eds.), *Cognition, Development and Instruction* (pp 5 - 37). New York: Academic Press.
- Case, R. (1980b). Implications of Neo-Piagetian Theory for Improving the Design of Instruction. In J.R.Kirby & J.B.Biggs (Eds.), *Cognition, Development and Instruction* (pp 161 - 186). New York: Academic Press.
- Chan, L.K.S. (1996). Motivational Orientations and Metacognitive Abilities of Intellectually Gifted Students. *Gifted Children Quarterly*, 40, 4, 184 - 193.
- Clark-Carter, D. (2004). *Quantitative Psychological Research*. Hove: Psychology Press.
- Clements, D.H. & Nastasi, B.K. (1990). Dynamic approach to measurement of children's metacomponential functioning. *Intelligence*, 14, 109 - 125.
- Cross, D.R. & Paris, S.G. (1988). Developmental and Instructional Analysis of Children's Metacognition and Reading Comprehension. *Journal of Educational Psychology*, 80, 2, 131 - 142.
- Daiute, C. (1983). Writing, creativity and change. *Childhood Education*, 59, 4, 227 - 234.
- Danner, F.W. (1976). Children's Understanding of inter-sentence organisation in the recall of short descriptive passages. *Journal of Educational Psychology*, 68, 174 - 183.
- Davidson, J.E. & Sternberg, R.J. (1998). Smart problem solving: how metacognition helps. In D.J. Hacker, J. Dunlosky & A.C. Graesser (Eds.), *Metacognition in Educational Theory and Practice* (pp 47 - 68). Mahwah, NJ: Lawrence Erlbaum.
- Davidson, J.E., Deuser, R. & Sternberg, R.J. (1994). The Role of Metacognition in Problem Solving. In J. Metcalfe & A.P. Shimamura (Eds.), *Metacognition; Knowing about knowing* (pp 207 - 226). Cambridge, MA: MIT Press.
- Day, J., French, L.A. & Hall, L. (1985). Social Influences on Cognitive Development. In D.L. Forrest-Pressley, G.E. MacKinnon & T.G. Waller (Eds.), *Metacognition, Cognition and Performance*. London: Academic Press.
- de Beaugrande, R. (1980). *Text Discourse and Process*. London: Longman.
- de Beaugrande, R. (1982). Psychology and Composition: Past, Present and Future. In M. Nystrand (Ed.), *What Writers Know*. New York: Academic Press.
- Dennison, R.S., Krawchuk, C.M., Howard, B.C. & Hill, L. (1996). The development of a children's self-report measure of metacognition. Paper presented at the annual meeting of the American Educational Research Association, New York.
- Devine, J. (1993). The role of metacognition in second language reading and writing. In J.G. Carson & I. Leki (Eds.), *Reading in the composition classroom: Second language perspectives*. Boston, MA: Heinle and Heinle.
- Devine, J., Railey, K. & Boshoff, P. (1993). The implications of cognitive models in L1 and L2 writing. *Journal of Second Language Writing*, 2, 203 - 225.



- Dreyfus H.L. (2001). *On the Internet*. London: Routledge.
- Dreyfus, H.L. & Dreyfus, S.E. (1986). *Mind over Machine*. New York: Free Press.
- Duffield, J. & Munro, N. (1999). *Teaching Writing 5-14: Final report of Writing Audit to Falkirk Council Education Services*. Stirling: University of Stirling Institute of Education.
- Duffy, T.M. and Jonassen, D.H. (1992). Constructivism: New Implications for Instructional Technology. In T.M. Duffy & D.H. Jonassen (Eds.), *Constructivism and the Technology of Instruction*. Hillsdale, NJ: Lawrence Erlbaum.
- Ellis, E.S. (1994). Integrating Writing Strategy Instruction with Content-Area Instruction. *Intervention in School and Clinic*, 29, 4, 219 - 228.
- Englert, C.S. & Raphael, T.E. (1988). Constructing Well-Formed prose: Process, Structure, and Metacognitive Knowledge. *Exceptional Children*, 54, 6, 513 - 520.
- Ericsson, K.A. & Kintsch, W. (1995). Long-term working memory. *Psychological Review*, 102, 2, 211 - 245.
- Feuerstein, R. (1980). *Instrumental Enrichment*. Baltimore, MD: University Park Press.
- Flavell, J.H. (1976). Metacognitive aspects of problem solving. In L.B. Resnick (Ed.), *The nature of intelligence*. Hillsdale, NJ: Erlbaum.
- Flavell, J.H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34, 906 - 911.
- Flavell, J.H. (1987). Speculations About the Nature and Development of Metacognition. In F.E. Weinert & R.H. Kluwe (Eds.), *Metacognition, Motivation and Understanding*. Hillsdale, NJ: Lawrence Erlbaum.
- Flavell, J.H., Miller, P.H. & Miller, S.A. (1993). *Cognitive Development* (3rd Edn.). Englewood Cliffs, NJ: Prentice-Hall.
- Flavell, H. & Wellman, H.M. (1977). Metamemory. In R.V. Kail & J.W. Hagen (Eds.), *Perspectives on the Development of Memory and Cognition*. Hillsdale, NJ: Lawrence Erlbaum.
- Flower, L.S. & Hayes, J.R. (1980). The dynamics of composing: Making plans and juggling constraints. In L. Gregg & E. Steinberg, E.R. (Eds.), *Cognitive Processes in Writing* (pp 31 - 50). Hillsdale NJ: Lawrence Erlbaum.
- Flower, L.S. & Hayes, J.R. (1981). A cognitive process theory of writing. *College Composition and Communication*, 32, 365 - 387.
- Gerig, T.M. (1975). A Multivariate Extension of Friedman's Chi-square test with Random Covariates. *Journal of American Statistical Association*, 70, 350, 443 - 447.
- Graham, S. & Harris, K.R. (1998). Self-regulation and strategy instruction for students who find writing and learning challenging. In Levy, C.M. & Ransdell, S. (Eds.), *The Science of Writing* (pp 347 - 360). Mahwah, NJ: Lawrence Erlbaum.
- Graham, S. & Harris, K.R. (2000). The role of Self-Regulation and Transcription Skills in Writing and Writing Development. *Educational Psychologist*, 35, 1, 3 - 12.
- Gunstone, R.F. & Northfield, J. (1994). Metacognition and learning to teach. *International Journal of Scientific Education*, 16, 5, 523 - 537.



- Hacker, D.J. (1998a). Definitions and Empirical Foundations. In D.J. Hacker, J. Dunlosky & A.C. Graesser (Eds.), *Metacognition in Educational Theory and Practice* (pp 1 - 23). Mahwah, NJ: Lawrence Erlbaum.
- Hacker, D.J. (1998b). Self-Regulated Comprehension During Normal Reading. In D.J. Hacker, J. Dunlosky & A.C. Graesser (Eds.), *Metacognition in Educational Theory and Practice* (pp 165 - 191). Mahwah, NJ: Lawrence Erlbaum.
- Hacker, D.J., Dunlosky, J. & Graesser, A.C. (Eds.). (1998). *Metacognition in Educational Theory and Practice*. Mahwah, NJ: Lawrence Erlbaum.
- Halliday, M.A.K. & Hasan, R. (1976). *Cohesion in English*. London: Longman
- Hardman, F. & Bevertson, S. (1995). Developing Collaborative Group Work in the Primary School: The Importance of Metacognition. *Reading*, 29, 2, 11 - 15.
- Harris, K.R. & Graham, S. (1992). Self-regulated strategy development: A part of the writing process. In M. Pressley, K. Harris & J. Guthrie (Eds.), *Promoting Academic competence and literacy in schools* (pp 277 - 309). San Diego, CA: Academic Press.
- Harris, K.R., Schmidt, T. & Graham, S. (1998). Every Child Can Write: Strategies for Composition and Self-Regulation in the Writing Process. In K.R. Harris, Graham, S. & Deshler, D. (Eds.), *Teaching Every Child Every Day: Learning in Diverse Schools and Classrooms*. Cambridge, MA: Brookline Books.
- Hayes, J.R. (1996). A New Framework for Understanding Cognition and Affect in Writing. In C.M. Levy & S. Ransdell, (Eds.), *The Science of Writing*. Mahwah, NJ: Lawrence Erlbaum.
- Hayes, J.R. & Flower, L. (1980). Identifying the organization of writing processes. In L.W. Gregg & E.R. Steinberg (Eds.), *Cognitive Processes in Writing* (pp 3 - 30). Hillsdale, NJ: Lawrence Erlbaum.
- Hertzog, C. (2002). Metacognition in older adults; implications for application. In T.J. Perfect & B.L. Schwartz (Eds.), *Applied Metacognition* (pp 169 - 196). Cambridge: Cambridge University Press.
- HM Inspectors of Schools. (2000). *Improving Writing 5 - 14*. Edinburgh: Scottish Executive Education Department.
- Howard-Rose, D. & Winne P.H. (1993). Measuring component and sets of cognitive processes in self-regulated learning. *Journal of Educational Psychology*, 85, 591 - 604.
- Huot, B. (1990). The literature of direct writing assessment: Major concerns and prevailing trends. *Review of Educational research*, 60, 237 - 263.
- Janssen, D., van Waes, L. & van den Bergh, H. (1996). Effects of Thinking Aloud on Writing Processes. In C.M. Levy & S. Ransdell (Eds.), *The Science of Writing* (pp 233 - 250). Mahwah, NJ: Lawrence Erlbaum.
- Johnston, R.S. & Watson, J. (1997). Developing reading, spelling and phonemic awareness skills in primary school children. *Reading*, 31, 37 - 40.
- Juliebö, M., Malicky, G.V. & Norman, C. (1998). Metacognition of young readers in an early intervention programme. *Journal of Research in Reading*, 21, 1, 24 - 35.
- Karmiloff-Smith, A. (1979). Micro- and macro- developmental changes in language acquisition and other representational systems. *Cognitive Science*, 3, 91 - 118.



- Kasper, L.F. (1997). Assessing the Metacognitive Growth of ESL Student Writers. *TESL-EJ*, 3, 1, A-1.
- Kellogg, R.T. (1994). *The Psychology of Writing*. New York: Oxford University Press.
- Kellogg, R.T. (1996). A Model of Working Memory in Writing. In C.M. Levy & S. Ransdell (Eds.), *The Science of Writing: Theories, methods, individual differences and applications* (pp 57-72). Mahwah, NJ: Lawrence Erlbaum.
- Kinnear, P.R. & Gray, C.D. (2000). *SPSS for Windows Made Simple*. Hove: Psychology Press.
- Kluwe, R.H. (1982). Cognitive knowledge and cognitive control: metacognition. In D.R. Griffin (Ed.), *Animal mind – human mind* (pp 201 - 224). New York: Springer-Verlag.
- Kluwe, R.H. (1987). Executive decisions and regulation of problem solving behaviour. In F.E. Weinert & R.H. Kluwe (Eds.), *Metacognition, Motivation and Understanding*. Hillsdale, NJ: Lawrence Erlbaum.
- Koriat, A. (2002). Metacognition research: an interim report. In T.J. Perfect & B.L. Schwartz (Eds.), *Applied Metacognition* (pp 261-286). Cambridge: Cambridge University Press.
- Kreutzer, M.A., Leonard, C. & Flavell, J.H. (1975). An interview study of children's knowledge about memory. *Monographs of the Society for Research in Child Development*, 159, 40, 1.
- Kuhn, D (2000). Theory of mind, metacognition, and reasoning: a life-span perspective. In P. Mitchell & K.J. Riggs (Eds.), *Children's reasoning and the mind* (pp 301-326). Hove: Psychology Press.
- Levy, C.M. & Ransdell, S. (1996). Writing Signatures. In C.M. Levy & S. Ransdell, (Eds.), *The Science of Writing* (pp 149 - 162). Mahwah, NJ: Lawrence Erlbaum.
- Lewiecki-Wilson, C., Sommers, J. & Tassoni, J.P. (2000). Rhetoric and the writer's profile: Problematizing directed self-placement. *Assessing Writing*, 7, 165 - 183.
- Lewis, G. (1998). The Use of Images in Exploring Processes of Writing. Paper presented at the National Reading Conference, Charleston: S. Carolina.
- McCutchen, D. (2000). Knowledge, Processing, and Working Memory: Implications for a Theory of Writing. *Educational Psychologist*, 35, 1, 13 - 23.
- McGuinness, C. (1993). Teaching Thinking: new signs for theories of cognition. *Educational Psychology*, 13, 3 and 4, 305 - 316.
- Manning, B.H., White, C S. & Daugherty, M. (1994). Young Children's Private Speech as a Precursor to Metacognitive Strategy Use during Task Engagement. *Discourse Processes*, 17, 2, 191 - 211.
- Marfo, K., Mulcahy, R.F., Peat, D., Andrews, J. & Cho, C. (1991). In R.F. Mulcahy, R.H. Short & J. Andrews (Eds.), *Enhancing Learning and Thinking*. New York: Praeger.
- Metcalfe, J. & Shimamura, A.P. (1996). *Metacognition: Knowing about Knowing*. Cambridge, MA: MIT Press.
- Nelson, T.O. & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G. Bower (Ed.), *The Psychology of learning and motivation* (Vol. 26). New York: Academic Press.
- Nelson, T.O. & Narens, L. (1994). Why Investigate Metacognition? In J. Metcalfe & A.P. Shimamura (Eds.), *Metacognition, Knowing about Knowing*. Cambridge, MA: MIT Press.



- Nicholls, J., Bauers, A., Pettitt, D., Redgwell, V., Seaman E. & Watson, G. (1989). *Beginning Writing*. Milton Keynes: Open University Press.
- Ollila, L., Schwartz, E.V. & Francis, L. (1993). Metacognition and Strategic Use of Computers: A Study of Creative Writing with Grade Four Children. The ITEC Project Information Technology in Education in Education of Children. UNESCO.
- Osborne, J. (2001). Measuring Metacognition in the Classroom: A Review of Currently Available Measures. Department of Educational Psychology, University of Oklahoma.
- Osman, M.E. & Hannafin, M.J. (1992). Metacognition Research and Theory: Analysis and Implications for Instructional Design. *Educational Technology Research and Development*, 40, 2, 83 - 99.
- Palincsar, A.S. (1986). Metacognitive Strategy Instruction. *Exceptional Children*, 53, 2, 118 - 124.
- Palincsar, A.S. and Brown, A.L. (1984). Reciprocal teaching of comprehension-monitoring activities. *Cognition and Instruction*, 1, 117 - 175.
- Paris, S.G. & Byrne, J.P. (1989). The constructivist approach to self-regulation and learning in the classroom. In B.J.Zimmermann & D.H.Schunk (Eds.), *Self-regulated learning and Academic Achievement: Theory, Research and Practice*. New York: Academic Press.
- Paris, S.G., Lipson, M.Y. & Wixson, K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology*, 8, 293 - 316.
- Perfect, T.J. & Schwartz, B.L. (Eds.). (2002). *Applied Metacognition*. Cambridge: Cambridge University Press.
- Pintrich, P.R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research*, 31, 459 - 470.
- Pressley, M., Borkowski, J.G. & O'Sullivan, J.T. (1984). Memory strategy instruction is made of this: Metamemory and durable strategy use. *Educational Psychology*, 76, 1239 - 1252.
- Pressley, M., Borkowski, J.G. & O'Sullivan, J. (1985). Children's Metamemory and the Teaching of Memory Strategies. In D.L. Forrest-Pressley, G.E. MacKinnon & T.G. Waller (Eds.), *Metacognition, Cognition and Performance*. London: Academic Press.
- Royer, D.J. & Gilles, R. (1998). Directed self-placement: an attitude of orientation. *College Composition and Communication*, 50, 54 - 70.
- Sanders, T. & van Wijk, C. (1996). Text Analysis as a Research Tool: How Hierarchical Text Structure Contributes to the Understanding of Conceptual Processes in Writing. In C.M. Levy & S. Ransdell (Eds.), *The Science of Writing* (pp 251 - 269). Mahwah, NJ: Lawrence Erlbaum.
- Scardamalia, M. & Bereiter, C. (1987). Knowledge telling and knowledge transforming in written composition. In S. Rosenberg (Ed.), *Advances in applied psycholinguistics, Volume 2. Reading, writing and language learning*. Cambridge: Cambridge University Press.
- Scardamalia, M. & Bereiter, C. (1991). Higher Levels of Agency for Children in Knowledge Building: A Challenge for the Design of New Knowledge Media. *Journal of the Learning Sciences*, 1, 1, 37 - 68.
- Schneider, W., & Lockl, K. (2002). The development of metacognitive knowledge in children and adolescents. In T.J. Perfect & B.L. Schwartz (Eds.), *Applied Metacognition* (pp 224 - 257). Cambridge: Cambridge University Press.



- Schoonen, R. & de Glooper, K. (1996). Writing performance and knowledge about writing. In G. Rijlaarsdam, H. van den Bergh, & M. Couzijn (Eds.), *Theories, Models and Methodology in Writing Research*. Amsterdam: Amsterdam University Press.
- Schraw, G. & Dennison, R.S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460 - 475.
- Schultz, K. & Fecho, B. (2000). Society's Child: Social Context and Writing Development. *Educational Psychologist*, 35, 1, 51 - 62.
- Schunk, D.H. & Schwartz, C.W. (1993). Goals and progress feedback: Effects on self-efficacy and writing achievement. *Contemporary Educational Psychology*, 18, 3, 337 - 354.
- Schwartz, B.L. & Perfect, T.J. (2002). Introduction: toward an applied metacognition. In T.J. Perfect & B.L. Schwartz (Eds.), *Applied Metacognition* (pp 1 - 14). Cambridge: Cambridge University Press.
- Sharples, M. (1985). *Cognition, computers and creative writing*. Chichester: Ellis Horwood.
- Sharples, M. (1999). *How We Write*. London: Routledge.
- Sitko, B.M. (1998). Knowing How to Write: Metacognition and Writing Instruction. In D.J. Hacker, J. Dunlosky & A.C. Graesser (Eds.), *Metacognition in Educational Theory and Practice* (pp 93 - 115). Mahwah, NJ: Lawrence Erlbaum.
- Smagorinsky, P. (1989). The Reliability and Validity of Protocol Analysis. *Written Communication*, 6, 4, 463 - 479.
- Smagorinsky, P. (1991). The writer's knowledge and the writing process: A protocol analysis. *Research in the Teaching of English*, 25, 339 - 415.
- Son, L.K. & Schwartz, B.L. (2002). The relation between metacognitive monitoring and control. In T.J. Perfect & B.L. Schwartz (Eds.), *Applied Metacognition* (pp 15 - 38). Cambridge: Cambridge University Press.
- Span, P. (1995). Self-regulated learning by Talented Children. In J. Freeman, P. Span, & H. Wagner (Eds.), *Actualizing Talent*. London: Cassell.
- Stratman, J.F. & Hamp-Lyons, L. (1994). Reactivity in concurrent think-aloud protocols. Issues for research. In P. Smagorinsky (Ed.), *Speaking about writing: Reflections on research methodology*. Thousand Oaks, CA: Sage.
- Tenney, Y.J. (1975). The child's conception of organisation and recall. *Journal of Experimental Child Psychology*, 19, 100 - 114.
- Tharpe, R. and Gallimore, R. (1988). A theory of teaching as assisted performance. In R. Tharpe & R. Gallimore (Eds.), *Rousing Minds to Life: Teaching and Schooling in Social Context*, (pp 42 - 61). New York: Cambridge University Press
- Thorpe, K.J. & Satterley, D.J.H. (1990). The Development and Inter-relationship of Metacognitive Components among Primary School Children. *Educational Psychology*, 10, 1, 5 - 21.
- Tobias, S. & Everson, P. (1995). Development and Validation of an objective Measure of Metacognition. Paper presented at Annual Meeting of the American Educational Research Association, San Francisco.
- Topping, K.J. (2001). *Thinking reading writing: A practical guide to paired learning, with peers, parents and volunteers*. London: Continuum International.



- Topping, K.J. (2002). Paired thinking: Developing thinking skills through structured interaction with peers, parents and volunteers. In G. Reid & J. Wearmouth (Eds.), *Dyslexia and Literacy: Theory and practice*. Chichester: Wiley.
- Vadhan, V. & Stander, P. (1994). Metacognitive ability and test performance among college students. *Journal of Psychology*, 128, 307 - 309.
- Vermunt, J.D. (1988). The regulation of constructive learning processes. *British Journal of Educational Psychology*, 68, 2, 149 - 171.
- Vygotsky, L.S. (1962). *Thought and Language*. Cambridge, MA: MIT Press.
- Vygotsky, L.S. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press.
- Wang, W. & Wen, Q. (2002). L1 use in the L2 composing process: An exploratory study of 16 Chinese EFL writers. *Journal of Second Language Writing*, 11, 225 - 246.
- Ward, T.B., Finke, R.A. & Smith, S.M. (1995). *Creativity and the mind*. New York: Plenum Press.
- Weinert, F.E. & Kluwe, R.H. (Eds.). (1987). *Metacognition, Motivation and Understanding*. Hillsdale, NJ: Lawrence Erlbaum.
- Wellman, H.M. (1985). The Origins of Metacognition. In D.L. Forrest-Pressley, G.E. MacKinnon, & T.G. Waller (Eds.), *Metacognition, Cognition and Performance*. London: Academic Press.
- Winne, P.H. (1995). Self-regulation is ubiquitous but its forms vary with knowledge. *Educational Psychologist*, 30, 4, 223 - 228.
- Winne, P.H. & Hadwin, A.F. (1998). Studying as self-regulated learning. In D.J.Hacker, J. Dunlosky & A.C. Graesser (Eds.), *Metacognition in Educational Theory and Practice* (pp 277 - 304). Hillsdale, NJ: Lawrence Erlbaum.
- Winne, P.H. & Perry, N.E. (2000). Measuring Self-Regulated Learning. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of Self regulation* (pp 531 - 566). San Diego, CA: Academic Press.
- Wright, D.B. (2003). Making friends with your data: Improving how statistics are conducted and reported. *British Journal of Educational Psychology*, 73, 1, 123 - 136.
- Wright, J. & Jacobs, B. (2003). Teaching Phonological Awareness and Metacognitive Strategies to Children with Reading Difficulties: A comparison of two instructional methods. *Educational Psychology*, 23, 1, 17 - 47.
- Zimmerman, B. (2000). Attaining Self-regulation: A Social Cognitive Perspective. In M. Boekaerts, P.R. Pintrich & M. Zeidner (Eds.), *Handbook of Self-regulation* (pp 13 - 39). San Diego, CA: Academic Press.
- Zimmerman, B. (2001). Theories of self-regulated learning and academic achievement: An overview and analysis. In B. Zimmerman & D. Schunck (Eds.), *Self-regulated learning and academic achievement: Theoretical perspectives* (pp 1 - 37). Mahwah, NJ: Erlbaum.
- Zimmerman, B. & Risemberg, R. (1997). Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology*, 22, 73 - 101.
- Zimmermann, R. (2000). L2 writing: subprocesses, a model of formulating and empirical findings. *Learning and Instruction*, 10, 73 - 99.







## **Appendix 1**

**Data gathering questionnaire used at stages 1 and 16  
(question 7 was also used at stage 9)**







# Thinking about your writing

The information which you give on this form is a necessary part of the internal evaluation of the course input. We hope however, that it will be helpful to you in your own writing development.

**All the information provided will be held as confidential.**

Please attempt all the following sections

1. Define good writing.

2. What makes a good writer?

3. What are the steps you would go through to produce a piece of academic writing (such as an assignment)?

4. What do you do if you want to improve a specific piece of your own writing?



5. What do you think these terms mean in relation to writing?

internal thoughts

genre

purpose

memory

6. Assess yourself as a writer (use whatever descriptors you wish).

My strengths

My weaknesses

7. Select from the 12 items in the list below, the **six** which you feel **at the moment**, to be the **most important for writing** in the two contexts given at the top of each column

GRAMMAR    WORDS & EXPRESSIONS    REFLECTING SPELLING    DISCUSSION  
DRAFTING    CONTENT    AUDIENCE    SEQUENCE    NEATNESS    PLANNING  
IDEAS

For me personally	For children I will be teaching

Name.....  
Date.....

Thank you for your co-operation.



## **Appendix 2**

### **Data gathering questionnaire used at stage 4**







# Thinking about your writing

## **Summary of earlier input which identified two key aspects of thinking and learning**

1. **Awareness is**                      **knowledge** about your self as a learner (*e.g. what kind of thinker are you?*)  
   **knowledge** about the learning task (*e.g. what are some of the things you might want to know about a task?*)  
   **knowledge** about the skills and strategies which you are able to use.
  2. **Monitoring and control are**    **scrutiny** of the learning goal  
   **evaluation** of progress towards goal  
   **adjusting** plans to achieve learning goal
- 

**Use this page to record your thoughts and reflections on what you did in completing the writing task on ' Why Stories Are Important for Children'.**

**1. Knowing what you are being asked to do.**

a. What did you do to try to understand the task?

b. What knowledge did you use?

c. How were sure that you were correct in your understanding.

**2. Understanding the appropriate way to write for this task.**

a. What did you do to decide on the most appropriate way to write (genre) for this task?

b. What knowledge did you use to make a decision?

c. How did you know that your decision was correct?



**3. Establishing the content of your writing.**

a. What knowledge (of yourself, of the task and of possible strategies) did you use in deciding on the content of your writing?

b. How much did you use your own ideas and how much new ideas from others?

c. In what respects was your knowledge clarified by sharing and by reading?

d. How did you decide what to include and what to reject?

e. What did you do to decide about your structure and sequence?

f. What did you do to monitor your progress, that is, to know if you were on the right track?

Name..... Date.....



## **Appendix 3**

### **Data gathering questionnaire used at stage 6 Personal writer profile**







# Your writer profile

Please complete a writer profile for yourself following the examples which we derived at the lecture session last week.

The five element of the writer profile are those which we discussed at the lecture and are summarised as follows.

**The Social Environment** - all the aspects of the influences of other people on what, when how and why we write. This includes sharing with and listening to others, collaborating or writing for others as well as recognising the influences others may have on our writing approach.

**The Physical Environment** - all the parts of your physical environment which affect your writing such as surroundings, noise, facilities available, interruptions from others. It also includes all that you have already written for a particular task and how that 'in front of you' influences what comes next.

**Motivation/Affect** - this includes all the things which influence how you feel about writing, the apprehensions as well as the excitements and pleasures. It also includes the difficulties which you might have in getting started or how your enthusiasm might easily be lost before you get finished.

**Cognitive Processes** - this all the thinking 'bits' which affect your writing, such as your planning, your thinking, taking decisions, trying to work things out, coping with challenges, your understandings etc.

**Long-Term Memory** - this is all that you have available from your past experience and how you use them or are conscious of using them. It also includes how easy it is to access the memories you have and how much you will try to remember things from the past.

The value ratings for each element are;

- 3 very relevant and important
- 2 moderately relevant and important
- 1 slightly relevant and important

One of the examples we used at the lecture is attached in diagrammatic form, but you can complete your writer profile in summary form if you wish.

Thank you very much.

Jim Ewing

Name..... Date.....







## **Appendix 4**

### **Data gathering questionnaire used at stage 11 Children's writer profile**







## Children's writer profile

As we discussed at the teaching session last week you are asked to gather information about children as writers in the format similar to that which you had previously used to create your Personal Writer Profile. Please do this during your next teaching placement which starts next week.

You should include

- the class you taught
- which section of the class (them all or one group or the top group, etc.) is the writer profile relates to (it might also be an 'average individual child')
- how writing was taught (such as: a writing scheme, teacher introduction and support, or a 'get on and do it' approach )
- a short description of each profile category relevant to your chosen child or children
- rating of the importance/relevance of each, where 3 is the highest and 1 is the lowest

### Here is an example

I was in a Primary 7 class. My observations are based on the whole class with the exception of two pupils. They used the North Lanarkshire writing scheme.

#### **The Social Environment – rating 3**

When the children were told they were doing writing, most of them moaned. However once they started discussing and brainstorming their ideas they seemed to really get going. This also helped the poorer children as they were able to get ideas and inspiration from others.

#### **The Physical Environment – rating 2**

When the children were planning and writing they did not use their word banks or dictionaries for reference. The children did not re-draft their work and I tried to emphasise the importance of checking their work before handing it in.

#### **Motivation and Effect – rating 3**

The children worked best when the teacher started with a stimulus or used some of her ideas. This allowed the children to work from this and expand. When they were told they could write anything they wanted this motivated them as there were no restrictions on what they wrote.

#### **Cognitive Process – rating 2**

Planning the children's work as a class allowed the poorer children to see how to structure their work. They needed this guidance on how to write each section.

#### **Long Term Memory – rating 1**

The majority of pupils found it difficult to recall what they had previously learned. The poorer group could not remember a lot of information which meant a lot of the time was spent going back over work they had done previously.

Please submit your children's writer profile in paper format or electronically with two weeks of returning from your school placement.

Thank you.

Jim Ewing







## **Appendix 5**

### **Data gathering questionnaire used at stage 14**







# Classroom evidence of regulation in writing

While on rural school placement look for instances of regulation in writing in each of the four areas we spoke about during the recent *lecture and note down some examples*. For each example, try to suggest whether the regulation was *Autonomous, Active or Conscious*.

To help you here are some possible examples

## ***Social self regulation***

Autonomous

Forming letters (handwriting) to accepted standard

Active

Changing ideas while writing, by copying others

Conscious

Taking the perspective of the reader while writing

Anticipating comments from others and taking account of them

Accepting the value of contributions from others

## ***Physical self regulation***

Autonomous

Adjusting the writing environment to become more 'comfortable' with it

Active

Making writing fit the task

Conscious

Managing physical resources required for the task

Frequent reference back at what has been written

Adjusting time schedules and priorities for writing

## ***Motivational self regulation***

Autonomous

Trying out writing in different media and materials

Active

Seeking positive reinforcement (am I OK?)

Conscious

Setting realistic personal goals

Recognising current emotional state

Countering emotional barriers to writing

## ***Cognitive self regulation***

Autonomous

Correcting spelling and grammar as writing

Active

Changing words rather than ideas in the content

Conscious

Trying to think of better expressions or content

Drafting and revising for improved versions

Checking veracity of factual writing

Complete the next page using your own observations.



If you find that self-regulation is not evident, you might try to encourage it with some emphasis on the following.

<b>Social</b> <i>Comments from others. Thinking about the perspective of the intended reader</i>	<b>Physical</b> <i>Management of resources for writing. Looking back at what has been written</i>	<b>Motivational</b> <i>Setting realistic personal goals. Promoting self esteem</i>	<b>Cognitive</b> <i>Checking the understanding of the task .Asking for revision and improved drafts</i>
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**Social regulation**

**Physical regulation**

**Emotional regulation**

**Cognitive regulation**

Name ..... Date .....

Please hand the completed form (or send an e-mail version) to me as soon as you return from the rural school placement.

Thank you

Jim Ewing



## **Appendix 6**

### **Responses from two students at all data collection stages**







## Key responses to data collection at all stages for two students.

Student X was graded as a good writer (grade 4 at the beginning, grade 5 at the end) and student Y was graded as a poorer writer (grade 2 at the beginning) and progressed to grade 3 at the end.

	<i>Student X</i>	<i>Student Y</i>
<b>Stage 1</b> Key responses to Questions 1 and 2	presentation process content the reader	the reader content
Key responses to Question 3	plan create a structure research put in references	research write a draft
Key responses to Question 4	high level monitoring low level monitoring control	high level monitoring low level monitoring
Key responses to Question 6	strengths - writing skills weaknesses - process	strengths - the reader weaknesses - the reader
Selection for Question 7 Self	spelling neatness grammar planning discussion drafting	grammar drafting audience reflecting content planning
Selection for Question 7 pupils	planning discussion neatness sequence spelling reflecting	spelling discussion ideas neatness sequence words & expressions writing grade 2
Writing grade	writing grade 4	writing grade 2
<b>Stage 4</b> Procedural knowledge	plan, check understanding, read, linked together, context	plan, linked together
Declarative knowledge	experiences, read, course, tutors, peers	experiences, peers
Monitoring	peer consultation, tutor consultation, compare with plan, presentation and clarity	peer consultation
<b>Stage 6</b> Writer Profile Social environment	share with peers and tutors (value 2)	consult with peers (value 2)
Physical environment	read the question and what have already written (value 2)	read the question (value 3)
Motivation/Affect	feeling of achievement (value 2)	sense of achievement (value 2)
Cognitive processes	decide what to include (value 3)	planning and researching (value 3)
Long-Term Memory	coursework, further reading, own ideas (value 3)	coursework and further reading (value 2)



<b>Stage 9</b> Selection for Question 7 Self (* = same as for stage 1)	grammar* spelling* content planning* sequence neatness*	planning* content* reflecting* discussion grammar* spelling
Selection for Question 7 Pupils (* = same as for stage 1)	grammar planning* ideas discussion* drafting spelling*	neatness* spelling* grammar drafting ideas* words & expressions*
<b>Stage 6</b> Writer Profile Social environment	mixed ability groups helped (value 3)	group work helped (value 3)
Physical environment	not much use of dictionary, noise level distracting (value 2)	best work from comfortable working conditions (value 2)
Motivation/Affect	more able children more motivated than less able, low self esteem in poorer children (value 3)	good motivation for stimulating and imaginative topics (value 3)
Cognitive processes	able children used plans and drafts, poor children stopped after first draft (value 2)	work well with plans (value 3)
Long-Term Memory	poor children did not remember relevant prior class work (value 1)	poor children needed help in remembering (value 3)
<b>Stage 7</b> Writing grade	writing grade 5	writing grade 2
<b>Stage 14</b> Social regulation	ideas changed by copying others	discussion helped to indicate gaps in children's writing
Physical regulation	little reference back to what had been written	did not read what had been written
Motivational regulation	constant reassurance needed and produced good results	all children were different
Cognitive regulation	drafting led to improvement of original writing	no evidence



Stage 16 Key responses to Questions 1 and 2	process presentation the reader	process content the reader
Key responses to Question 3	check understanding plan create a structure write a draft check spelling	plan write a draft check spelling
Key responses to Question 4	control	low level monitoring control
Key responses to Question 6	strengths - writing skills, structure weaknesses - creativity	strengths - preparation  weaknesses – writing skills
Selection for Question 7 Self (** = same as for stage 1 and stage 9)	planning** grammar** spelling** drafting neatness** content	planning** drafting sequence discussion content** audience
Selection for Question 7 Pupils (** = same as for stage 1 and stage 9)	ideas words & expressions discussion** drafting content audience	planning spelling** sequence drafting ideas** words & expressions**
Writing grade	writing grade 5	writing grade 3



